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ABSTRACT

This handbook on teaching is divided into seven parts. Following the introduction (Part I), Part II presents essays on student and faculty rights and responsibilities, evaluation and assessment, grades, and teaching and efficiency. Part III is a summary of interviews on teaching and research with 20 professors from the University of Kansas recognized for their outstanding teaching. The interviews offer personal opinions of the rewards of teaching, the relationship between teaching and research, and ways the university could encourage teaching. Part IV presents a discussion of the "technical skills" of teaching including lecturing, set induction, closure, discussion skills and use of questioning in discussion groups. Part V lists and briefly describes the seventy "Improvement of Instruction" awards funded by the University of Kansas Endowment Association. Part VI is an annotated bibliography of books, journals, and articles pertaining to all phases of instruction, particularly the problems and merits of teacher evaluation. Finally, Part VII is a directory of audio/visual services available at the University of Kansas. (Author/SPG)

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ON TEACHING

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Preface

As reflected in the guidelines for advancement in position and rank by faculty members, the improvement of teaching is of great importance to those who serve in the Office of Academic Affairs. The Office of Instructional Resources is charged with this responsibility in particular, but the other activities in the Office of Academic Affairs are all supportive of the teaching mission in one way or another, whether it be by means of efforts to acquire scientific equipment for laboratories, or by the University Committee on Promotions and Tenures' deliberations on faculty sabbatical awards. This handbook represents an attempt to bring together diverse sources which seem to offer useful insights on teaching. It will, of course, be augmented and updated from time to time. We hope that you will find it helpful.

Ronald K. Calgaard
Vice Chancellor for
Academic Affairs

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PART I: INTRODUCTION

I believe that university professors have chosen their profession in part because they enjoy working with students; that is, they are interested in students' academic and personal growth. Such concern complements a thorough knowledge of their academic discipline and a commitment to adding to the knowledge of that discipline. Thus, professors are continually engaged in acquiring a greater understanding of the factors directly or indirectly affecting students' acquisition of content and their use of knowledge in their professional and personal lives.

In discussing the role of the professor, it has been suggested that many or all teaching duties might be better carried out through the use of such means as programmed instruction booklets or computer assisted instruction. A definition of the teaching role which encompasses such activities is certainly appropriate, as it behooves teachers to use whatever technology is useful and within their ability to acquire and utilize. However, the idea of teachers versus machines is inappropriate.

Each has particular advantages with regard to teaching. Both are needed. A teacher who can be replaced by a machine should be replaced —by someone who can do what a machine cannot do. Most human instructional activities are heuristic for they emphasize inquiring, inductive, hypothesis-generating modes of instruction rather than fact dispensing, deductive, expository modes.

Another assumption about teaching I hold is that there is no such thing as the "best" teacher. No one teaching mode will meet the myriad of different styles required by the varying instructional goals, instructional settings or student characteristics. Unfortunately, many early efforts in educational research were directed toward finding some kind of definitive composite of teaching characteristics and behaviors which, supposedly, would work for all teachers. As might be expected, this research did not provide teachers with productive advice. It did not produce findings which could lead to significant and pervasive improvement of students' learning experiences because the lists could not be generalized for all teaching situations.

Although there is no single list of general characteristics and behaviors all teachers are encouraged to acquire, certain teaching behaviors are recommended. However, the strategies and skills of teaching likely to be productive in terms of student learning have been developed from a different point of view. This newer tradition places emphasis on determining, by a systematic investigatory process, the basic skills of instruction. Observation of successful teachers is part of the process, but not the only step. From observations, hypotheses are developed and tested about the aspects of such skills which make them valuable. Through such research, more accurate information about what makes successful teaching can be obtained.

These findings can be recommended to professors with a greater chance of their being useful because their focus on the essence of various helpful skills allows both generalization and adaptation to the specific needs and goals of teachers in a variety of situations. For example, the basic idea behind the skill of reinforcing student achievement is that such recognition helps to strengthen learning bonds as well as to foster student commitment to the subject. With this in mind, teachers in physics may use written symbols on laboratory reports whereas teachers in speech and drama might use verbal and visual cues to reinforce their students. In either case, however, the principle is the same.

The goal of the Office of Instructional Resources of the University of Kansas is to enhance the academic and personal benefits received by students from their classroom experiences at the university level. In so doing, its efforts reflect the previously discussed position that there is no single best style of teaching that should be adopted by all teachers. Rather, different teaching skills are required for different subjects and teaching situations. This does not mean there are no useful, generic skills for a variety of classroom and laboratory situations. Instead, it means that in seeking to improve instructional skills, the teacher should remember the importance of adapting generic skills to personal, unique goals and needs.

The Office of Instructional Resources is part of the Office of the Vice Chancellor for Academic Affairs. It works with individuals, departments, and groups such as the Committee for Advancement of Instruction and Advising of the College of Liberal Arts and Sciences, and the American Association for University Professors' Committee on the Evaluation and Improvement of Teaching. The OIR also works with similar programs at other universities, and carries out research on the instructional process with the cooperation and consultation of the various groups involved. To assist in its operation, there are faculty constituted advisory boards for the office itself and in particular, for the Curriculum and Instruction Survey. The former assists specifically with the Improvement of Instruction Awards and the latter, with the technical and statistical aspects of the Survey.

More specifically, the following objectives and activities seem appropriate and useful to the mission of the Office of Instructional Resources:

1. To help teachers improve their instructional procedures directly by:
    A. Acquainting them with innovations in teaching, and with psychological, social psychological and sociological research relevant to teaching procedures and situations. This is done through seminars, visits with faculty groups, and by means of a small professional library, which includes an extensive collection of books on small group interaction and interaction analysis. The office also assists in the search for abstracts on subjects related to classroom interaction or evaluation through the use of the Educational Resources Information Center (ERIC) system. Printed copies of annotated bibliographies

from ERIC, on a variety of topics, will soon be provided. For a nominal cost, other ERIC searches can be made.

B. Helping teachers to assess and refine their teaching through activities such as:
   1. student assessment and/or evaluation surveys (for example, Feedback).
   2. faculty and department assessment surveys (to meet the individual information needs of departments).
   3. videotaping service (for diagnosis of classes and recording of lectures).
   4. workshops and seminars on the improvement of instruction, teaching methods, grading and other educational topics throughout the semester.
   5. microteaching in consultation with OIR staff (to improve particular teaching skills using short, video-taped sequences followed by immediate playback and review).
   6. visitation of classrooms, upon request, followed by diagnostic-oriented discussion.

2. To help teachers improve their instructional procedures indirectly by:
   A. Working with other individuals and organizations concerned with improving teaching at the university level, as previously mentioned.
   B. Carrying out research on the instructional process with the cooperation and consultation of various groups.
   C Working with various departments and University committees to establish more valid grading procedures.

Thus, the Office of Instructional Resources serves as a resource center and catalyst for the University. It helps to stimulate and assist professors and their departments in diagnosing and revising their instructional activities to be more useful to students' learning. In so doing, I am keenly aware that in truth, the University itself is *the* Office of Instructional Resources.

In sum, the various sections of this handbook have been prepared in hopes that they will help us to arrive at a more accurate conception of our teaching goals and means.

A glance at the table of contents should illustrate the eclectic approach taken by OIR, as reflected in this handbook. Such a procedure requires the efforts of many people working to orchestrate the various approaches to the improvement of university instruction. I have been greatly helped in the production of the book by the advice and contributions of many people, including Professor Jerry Hutchison, Dean Dale P. Scannell, Professor Lelon Capps, and Sally Six Hersh. Sally spent several months interviewing department chairpersons and their staffs to prepare an inventory of campus audio/visual resources and services. Her huge, two volume report is frequently used for assessing present and future campus needs. The services directory included here is taken from the report.

The work of Kaethe Schick is interwoven in all of the sections, but in particular, in the annotated bibliography, for which I was her assistant. Grace Cleaver's imagination and expertise have helped with the production and arrangement of the report as well as with the contents. Special thanks go to Carol Francis, for her editorial assistance.

With appreciation and respect, I also wish to acknowledge the help of Dr. Ambrose Saricks, my friend and mentor, under whose direction the project began.

The handbook has been designed to be both philosophical and practical. Part II contains essays on teaching, previously published in the University Daily Kansan. Part III is a summary of interviews on teaching and research with twenty professors on campus recognized for their outstanding teaching. The interviews offer personal opinions of the rewards of teaching, the relationship between teaching and research, and ways the university could encourage teaching. Part IV presents a discussion of the "technical skills" of teaching. Identified through research at Stanford University as teacher behavorial skills which facilitate learning, the skills are useful additions to the repertoire of an effective teacher. Part V lists and briefly describes the seventy projects funded, over the past four years, by the University of Kansas Endowment Association. These awards have been made through an annual "Improvement of Instruction" competition. Part VI is an annotated bibliography of books, journals, and articles which pertain to all phases of instruction. Particularly emphasized are articles focusing on the problems and merits of teacher evaluation, currently a much-debated and complex issue confronting most departments on all campuses. Finally, Part VII is a directory of audio/visual services available on campus.

Philip C. McKnight

PART II: Essays on Teaching

Philip C. McKnight

- Student and Faculty Rights and Responsibilities
- Evaluation and Assessment
- Grades: A Matter of Achievement
- Teaching and Efficiency

Student and Faculty Rights and Responsibilities

A primary responsibility of the university is the advancement of knowledge. This is accomplished in two related ways. First, societal advancement occurs through research, whether done in a laboratory, in a forest or in the library. It may involve study of slime molds in cancer research or of the aerodynamic potential of an airplane wing configuration. It may focus on the development of autistic children or on the development of Elizabethan poetry; the history of philosophy or the philosophy of history; on the lives of the Mennonites in early day Kansas or the contributions of present day Mennonites following national disasters.

Second, universities help to advance individual students' understanding of themselves and their world, so that they too can contribute to society, as well as to their own intellectual, aesthetic and ethical growth.

There is, of course, a great deal of overlap in the two activities. In fact, it may be said that teaching and research are not simply complementary—they are symbiotic. That is, when a professor prepares a lesson, personal research should be an integral part. It would be impossible for this work not to be included—unless the professor has stopped learning.

A key element in both teaching and research is time. Someone once told me that all we really have in life is time. From this viewpoint, time is the essence of life. The concept is of particular importance in education because there are too many demands on one's time to be met with the limited amount available. The quandry, often agonizing, is how to meet the needs of students while also being involved in university service, research, professorial society activities, and community service.

My feeling is that as students and faculty we can better reach our goals if we consider them in light of our interrelated responsibilities. In the pursuit of knowledge and understanding, student rights involve faculty responsibilities, and vice versa.

With these thoughts in mind, I would like to suggest several new faculty and student rights and responsibilities with the hope that they will stimulate further discussion and action. First, students and teachers are responsible for being prepared for class. For the teacher, this means a sufficient amount of time in preparation for his class, whether it be a large group presentation or a seminar. It also means keeping up with one's discipline through reading and experimentation. "Read or Perish" should be as important as "Publish or Perish."

The student should also be responsible. Reading assignments are seldom made capriciously. They are made so the student will be able to integrate classroom learning with outside work. The two kinds of learning are complementary and both are crucial.

Student participation also includes the responsibility for attending classes regularly, and for being actively involved. For example, if students feel that classwork is redundant or dysfunctional, they should indicate this to their teacher.

Second, students have the right to expect faculty members to provide sufficient out-of-class time with them. Faculty members may need to be in their offices more of the time to be sure that students have sufficient opportunities to obtain advice and assistance. This may mean making greater efforts to stay longer during the day or to come in earlier.

It certainly means that we should make every effort to be at our appointments on time and to keep office hours as we set them.

I feel that we are not fulfilling our advising responsibilities adequately. If we were, I suspect that it would be clear to all--faculty, students and the public, that there are too few of us for the task. We might be in a better position to argue for smaller faculty-to-student ratios. Given the traditional and pervasive problem of not being able to point to our successes, such commonly agreed upon evidence of commitment would be welcome. I think we would be pleasantly surprised at how logical we could be about our requests for more help.

For the student's part, responsibilities involve keeping appointments, being prepared for them and not taking longer than necessary. Students also need to differentiate between conversations which are primarily oriented to academic or pedagogical matters and those which are of a personal nature. Distinguishing between them is often difficult. Yet a teacher, faced with the role conflict of being both a mentor/advisor and a judge of academic performance and promise, must know the difference. The obligation for maintaining professional detachment and integrity in such matters as evaluation is partially that of the student's.

These comments and suggestions apply to our commitment to students both before and during the semester, because advising is a continuing process. After enrollment, conferences are useful for assessing students' satisfaction with and achievement in their courses, and for helping them plan and prepare for their subsequent courses.

Unfortunately, advising seems to be overlooked, perhaps because it is assumed to be something that happens only at enrollment or an activity limited to interpretation of program requirements for majors and minors. If there is one activity that deserves a significantly greater commitment on the part of faculty and students, it may well be this one.

Third, with regard to books, and other instructional materials, the responsibilities extend beyond students and faculty to the university itself, which has an obligation to provide sufficient breadth and depth of its resources. This not only includes numbers of books, etc., but the assistance for helping students find and use books. It means that students have a right to expect the reserve room of the library to have more than one copy of a much-used book and for the reserve room to remain open as much as possible. As a community of students and scholars, we should help our colleagues in the library whenever possible in their efforts to make more books and services available to us. The libraries are absolutely essential to all of us.

With regard to faculty members, it seems to me that we are responsible for helping the library keep informed of the books that would be the most useful acquisitions. This is particularly true now in a time of spiraling book costs. We should also return books within a reasonable amount of time and immediately when a recall notice is sent. Students have a right of easy access to books. They also have the responsibility of returning books in good condition.

Fourth, students and faculty members have the right to expect honest efforts from each other. Teachers who never update or revise their lessons are cheating their students. Similarly, faculty members have a right to expect students' work to be their best and for it to be their own work. It is a waste of everyone's time for teachers to critique shoddy work or work that does not represent the student's own effort.

There are many other student and faculty rights and responsibilities, and I hope, perhaps with your help, to identify more of them.

Evaluation and Assessment

Consider the following three situations:

1. A University of Kansas class has been talking about the need for cooperation at the international, national, local and individual levels. The point has been made that since we are all in this together on tiny spaceship Earth, it is to everyone's advantage to cooperate with his fellow men. After the discussion, the instructor reminds students that their answers to study questions over the topic are due next week, and then says that students are not to work with anyone else in constructing their answers.

Question: Since the exercise is not a test, why should the students be cautioned against cooperative efforts on the topic of cooperation?

2. During a final examination in a graduate course, one of the students finds that there is no more ink in his pen. He turns to the student next to him and asks if he might borrow a pen or pencil to complete his essay. The other student looks at him incredulously and says, "Of course not—why would I want to help you get a better score? We're being graded on the curve."

3. In his senior year, a student learns that he will not be admitted to membership in Phi Beta Kappa. The news is not taken lightly because the father, mother, older sister and grandfather were all selected for membership. After investigating the grade point average and the criteria for selection to the organization, the student finds that his overall g.p.a. of 3.64 fell below the 10 per cent cut-off point for admission. The cut-off

point was 3.65. A review of the transcript reveals the "if only's." For example, there was the course in astronomy taken for credit-no credit at another school the summer after the freshman year. When it was transferred to the university, it was recorded as a "C."

Obviously, the topic discussed here is that of grading or conclusion-oriented evaluation. Few, if any, useful answers to the dilemma have been posed. At this point I have no solutions either. But I do have two hunches concerning the nature of the problem which I would like to share with you.

First, we have not done a very good job of approaching the problem. We talk about assigning letter grades or credit-no credit but seldom consider the purposes of those grades. This situation usually leads to a debate where the topic becomes one of letter grades vs. credit-no credit. A better approach to the question may be to ask the question, "What kind of evaluation is called for here?" In other words, we must begin to ask, "Grades for what?"

Taking this kind of reasoning reveals two facts about the needs which evaluations meet: 1) Evaluation provides information, for other people removed in time and space, about a student's performance. Evaluation reflects and records relative success and also predicts future success. 2) Evaluation provides information to the student about his performance, supposedly to improve such performance. In this sense, evaluation is part of the teaching process.

I should note here that I feel both functions are important. I am not against end-of-course grades. However, we do need to separate the two functions; i. e. we need to distinguish between evaluation and assessment. The dominant use of grades now is for judgement. Grades are not used very intensively for teaching purposes. Did it ever strike you as odd that in many courses the only tests are a mid-term and a final examination? In such cases—particularly where the mid-term is not returned promptly—there may not be sufficient opportunity for students to learn from papers, appointments, etc., to compensate for the loss of the tests' pedagogical value.

The final exam is a subject in itself. For now, consider the impact upon students of a three-hour final exam in a course with a mid-term and no papers. The exam contains six essay questions, each of which could be adequately answered only if given a day. The instructor hasn't taken the test himself to see how much time it takes to answer each question. What if you were a student who perceived that a "B" would change your chances for admission to medical school? How would you react to such an examination, especially if your exam schedule showed two other finals before this one?

Assuming that more pedagogical evaluations are to be provided, there are certain implications of the use of such diagnostic grading. For one, the final examination might be given the first day of class, so that the concepts which students are to learn would be made known to them. The exam would serve as an overview to the course and as a kind of list of study questions.

Another implication is that teachers should be given more time and assistance to provide students with diagnostic information. Teaching assistants are not a luxury; they are absolutely necessary. A short discussion with teachers with large lecture courses and laboratory sections will provide conclusive information on this point. For this reason, I hope that the formula for providing universities with faculty positions will be changed so that, for example, where one teaching position is assigned for each 15 students, the formula would be changed to assign one position for each 10 students. Such a change could be justified easily, I feel, if we were meeting our pedagogical responsibilities.

Other implications of providing adequate diagnostic assessment to students will be discussed at length later. The key word in that discussion will be "time"—time given to students in the form of teacher availability and increased feedback on student work, and time provided for the University by the state in the form of more teaching positions so that the University can assure that, e.g., every student has adequate advising and tutelage.

Grades: A Matter of Achievement

Discussions about grading may be characterized in two ways: they are splintered and they are inconsequential. The splintered, disparate nature of such discussions is a reflection of the number and complexity of the variables involved. Different courses, instructors, students, and values are reflected in the information presented.

Yet, a tacit assumption seems to exist that the experiences are comparable, thereby making the points raised in such discussions generalizable to a variety of subject areas and classroom situations. Seldom, if ever, does someone ask what course a person was referring to when he tells of missing an "A" by one point. The response is more likely to be one "I know—let me tell you what happened to me in. . ."

With regard to the closure reached at the end of such conversations, it is usually lacking. There is seldom a resolution or even a resolute feeling about what should be done. Some suggestions may be offered but the principal value of the discussion often seems to be therapeutic. Common to these discussions is a sense of confusion about how to approach an apparently chaotic situation. But there is also an underlying sense of frustration which stands in the way of meaningful reform. Such frustration is caused by the fact that the normal curve has become prescriptive instead of descriptive; i.e. grading procedures seem to reflect an assumption that in any and all class situations, there should be a "spread" in the grades.

One teacher's comment of a colleague's reprimand for "giving too many A's" reflects the phenomena. Logically, such a comment could never be made. Grades should reflect performance—thus this teacher should have been pleased to find that most of the class had reached the level of achievement to be recognized by the symbol "A." It is disturbing to hear comments about a teacher being good because he is a "tough grader." It is equally disturbing to hear students thank their instructors for "giving" them a grade. Student achievement should be the criterion for grades attained—nothing else. Thus, if an entire class achieves grades of "A"—fine. On the other hand, they should be free to fail, also.

Such allocation of grades on bases other than achievement may be a reflection of something more insidious than inept or inadequate evaluation procedures. It is possible that grades are one means by which a society seeks to allocate scarce resources by effectively precluding some of its constituents from being able to compete for them.

If, for example, 10 per cent of the students are chosen for Phi Beta Kappa membership, the other 90 per cent do not have the opportunity for advancement which accrues from such membership. Or, if a high school student is assigned to a "slow learner track" in the sophomore year, life's chances for that person have been diminished by the unavailability of many pedagogical opportunities, not only that year, but in subsequent years.

The point is not that Phi Beta Kappa or ability tracking are bad, but that they are not carefully used. In other words, what does a Phi Beta Kappa key represent? A sort of general index of ability? If so, then the index should be defined. Not to do so is to leave open misinterpretation of the honor—not only to imbuing the key with significance it does not have, but to precluding recipients from receiving justly deserved awards.

I have heard interviewers from business and industry say they do not want Phi Beta Kappa recipients because they are not practical. Not practical for what? Can practicality be ascertained by looking over a grade transcript?

In sum, recognition of an achievement may be inadequate and often perverse because criteria for grades are ill defined or used for social purposes. The tragic fact is that shunting aside many students on invalid or inappropriate grounds diminishes their potential contribution to our society at a time when we need everyone's contribution. The solution to this problem may involve a fundamental shift in our values.

Teaching and Efficiency

There is much attention currently being given to having universities demonstrate the value of their courses and curricula to the public. Such evidence is seen by many as prerequisite to universities' requests for funding. Because the improvement of teaching at the University of Kansas and elsewhere is integrally tied to such financial support, this essay considers a potentially critical situation: a return of conditions described by Raymond E. Callahan in his book, Education and the Cult of Efficiency.[1]

Callahan's book is relevant to us because conditions today are similar to those of the early 1900's when the progressive thrust of education was slowed. Similarity between the pattern of events emanating from the similar underlying conditions of the two eras is more difficult to predict at this point, but because it is possible that we could experience another cult of efficiency, a review of the historical may help us to deal with the present. Hopefully, familiarization with the consequences of the educational cult of efficiency in America will help prevent similar events from occurring today in secondary and post-secondary education.

The basic problem discussed here is that educators cannot point to their successes. We intuitively know that what we are about is of value and that courses and degrees do mean more significant lives for students, materially as well as aesthetically. And, most legislators and their constituents would, I feel, agree.

However, legislative budgetary discussions may be influenced by a feeling that a great deal of money is being spent for higher education with no visible outcomes, leading to the unfortunate conclusion that because its "products" are not measurable, higher education does not need as many resources.

It is as if to reason that because the product is indeterminate the process can, or should, get along with fewer resources. In other words, if the use of resources "A," "B," and "C" leads to the production of "?," then to diminish "A," "B," "C" by "A" should make little or no difference because no dimunition of "?" can be observed.

Thus, the inability to point to measurable products places the university in double jeopardy. It cannot produce hard data to justify additional funding, and it has difficulty defending against cutbacks because it cannot easily point out where and how cutbacks will diminish the value of the product (the pedagogical and personal enrichment of the student).

The underlying conditions as discussed by Callahan were:

(1) The vulnerability of educators, as previously discussed, who cannot point to measurable successes. This situation also exists today.

(2) The prestige of business and industry, and our respect for opinions of their leaders on matters unrelated to their areas of competency.

(3) The muckraking movement. In the early part of the century, the writers were Tarbell, Sinclair and Steffens. Today, in education, they are Goodman and Illich.

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[1] Raymond E. Callahan, *Education and the Cult of Efficiency* (Chicago: The University of Chicago Press, 1965).

The specific events which led to the original cult of efficiency in education were (1) the period around 1910 of inflation and recession (similar conditions existed in the early 1970's) and (2) the influx of large numbers of students of divergent linguistic and social backgrounds during that time (paralleled recently by efforts to educate students with divergent socio-economic and pedagogical backgrounds).

The pattern of events which emerged from the preceding conditions in 1910 may be roughly summarized as follows:

At a time when the schools were burdened with new demands (not only large numbers of migrants, but a more complex divergent school population), economic conditions were unfavorable to making an adequate response to the needs. Worse, the muckraking movement made education one of its targets. Unfortunately, the response of school administrators to these events was not to lobby more strongly for adequate resources, but to defensively seek means of justifying existing support. In trying to do so, they happened upon the industrial efficiency methods of Frederick W. Taylor, who had begun a movement of cost effectiveness in industry.

The result of the application of industrial efficiency methods and philosophies to educational problems are the main subject in Callahan's book, and the examples and citations are sobering. Though the intent of the movement was idealistic, results were stifling.

Ideas have results, yet those who became enamored with efficiency in education did not anticipate the consequences of their ideas and actions. As a result, efficiency became an end in itself, and the grand plans for making all aspects of education identifiable, measurable and therefore accountable became oppressive means of stultifying educational institutions and endeavors.

Perhaps the underlying cause of the tragedy was one of misplaced precision—of people who tried to make education accountable but who ended up trying to make education *countable.* Instead of undertaking the very difficult task of more adequately assessing educational growth, the reformers turned to assessing whatever was assessable by using the industrial efficiency models of Frederick Taylor and others. It is difficult to imagine the logic of comparing schools to mercantile establishments, teachers to factory managers, and students to raw material, but it is not difficult to identify examples of such reasoning. Consider the following statement about the need for "educational engineers." In particular, note point six:

"Such engineers would make a thorough study of (1) the pupils who constitute the raw material of the business of education; (2) the building and other facilities for teaching, which make up the plant; (3) the school boards and the teaching staff, who correspond to the directorate and the working force; (4) the means and methods of instruction and development; (5) the demands of society in general and of industry in particular upon boys and girls—this corresponding to the problem of markets; and,

(6) the question of the cost, which is almost purely a business problem."[2]

The application of what Callahan calls the Great Panacea led to practices such as keeping elaborate systems of records and reports to provide factual data on education. One inevitable category of "hard" data was financial. Superintendents began to develop means of assigning budgetary dollar values to the subjects taught instead of seeking means of assessing the value of the subject to the art of teaching.

Frank Spaulding's system, for example, led to the question:

"Why is a pupil recitation in English costing 7.2 cents in the vocational school while it costs only 5 cents in the technical school? Is the 'vocational' English 44 per cent superior to the 'technical' English or 44 per cent more difficult to secure? Why are we paying 80 per cent more in the vocational than in the technical school for the same unit of instruction in mathematics? Why does a pupil-recitation in science cost from 55 per cent to 67 per cent more in the Newton High than in either of the other schools?"[3]

The seemingly inevitable result of such reasoning was the reduction of costs by increasing the number of classes for each teacher and the class size, the legacy of which we struggle with today. Another result of such reasoning was the idea that the same school administration should be responsible for tasks and decision of both a financial and educational nature.

In terms of the cult of efficiency's impact on teachers' and students' activities, the following practices speak for themselves:

1. Joseph Taylor's charts for rating teachers on such things as the time they spent passing and collecting papers.

2. A student efficiency test that asked students whether they slept with at least one window open (worth 2 points), whether they placed a light behind their left shoulder while studying, whether they "loafed on the streets" (worth minus 2 points) and whether they got enough sleep to awaken on their own accord at a regular hour. Presumably, having someone else waken them would have been inefficient.[4]

Perhaps Ellwood Cubberly's statement sums it up:

"Our schools are, in a sense, factories in which the raw products (children) are to be shaped and fashioned into products to meet the various demands of life. The specifications for manufacturing come from the demands of the twentieth-century civilization, and it is the business of the school to build its pupils to the specifications laid down. This demands good tools, specialized machinery, continuous measurement of production to see if it is according to specifications, the elimination of waste in manufacture and a large variety in the output."[5]

The unfortunate results of this early cult of efficiency in America were profound and pervasive. There was a mania for recording "hard data" about school's efforts, as illustrated previously. Such practices as teacher and student efficiency tests led to unfortunate conceptions of the schools.

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[2] *Ibid.*, p. 62.
[3] *Ibid.*, p. 74.
[4] *Ibid.*, p. 109.
[5] *Ibid.*, p. 152.

One of these was the idea of the school as "America's Service Station." I presume that such schools would offer regular courses for the average, premium for the advanced and nothing for those who take too long to fill.[6]

The tragedy of the cult of efficiency, according to Callahan, was in "adopting values and practices indiscriminately and applying them with little or no consideration of educational values or purposes.

"It was not that some of the ideas from the business world might not have been used to advantage in educational administration, but that the wholesale adoption of the basic values, as well as the techniques of the business-industrial world, was a serious mistake in an institution whose primary purpose was the education of children. . . . It is possible that if educators had sought 'the finest product at the lowest cost' . . . the results would not have been unfortunate. But the record shows that the emphasis was not at all on 'producing the finest product' but on the 'lowest cost.' "[7]

Though the results of the first cult of efficiency may be evident, they may not be visible or important enough to preclude the re-emergence of attitudes sympathetic to misguided efficiency efforts.

The current enthusiasm for educational accountability could provide the impetus and vehicle for a second cult. Thus, we need to inform the public of the problems of attaining educational efficiency.

For example, we might point out that while it would seem useful from a cost effectiveness standpoint to be able to describe our product (in terms of student abilities), it would be inappropriate to do so.

For one thing, we need to keep as many options open to students for as long as possible. They are not here primarily for information, but for ways of dealing with information. If the only purpose of the university was to convey information efficiently, there would be no need for a campus. A campus enables students and teachers to come together to deal with the information. But to do so requires time—and just as crucially, it requires varying amounts of time for different students. Such diversity should not be labeled "inefficiency."

For another thing, our society has never been adept at forecasting and meeting occupational needs, partially because many of these occupations do not presently exist. Though it would be more efficient now to prepare for specified jobs, precisely the opposite is needed so that students can adapt to new opportunities. The kinds of curricula needed for this kind of liberal education are more likely to be inefficient in terms of measuring how they influence their graduates' occupational behaviors.

Regarding the advancement of knowledge in general, it can seldom be scheduled in advance into distinct modules of time. If that were so, cancer would not exist. The important issues of life take much time and much inefficient bumbling. As any honest researcher, whether in the physical, natural, or social sciences will admit, research is messy. Even when most of the parameters have been ascertained, the interplay of the variables seldom lends itself to efficient sorting out. But removing this responsibility from the university because of its "inefficiency" would be tragic.

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[6] *Ibid.*, p. 226.
[7] *Ibid.*, p. 244.

President Richard Lyman of Stanford University sums up the problems of striving for efficiency in education: ". . . It won't do us much good to have the whole system beautifully organized and transformed into a cost account's paradise, if the heart and soul have been squeezed out of it."

I would like to close on an optimistic note, but it is difficult when one considers that the original cult of efficiency in education was not overcome by reason. It collapsed of its own weight. (Although some go so far as to say it never did collapse but became a permanent phenomena). At any rate, the possibility of a reemergence of the cult of efficiency must be taken seriously. For example, a suggestion was made recently to the National Commission on the Financing of Post Secondary Education that the commission draw up national uniform standards for calculating per-student educational costs. The terms here have a haunting familiarity.

As I previously stated, we must be sure of what we want, because we will probably get it. Consider the possibility of what we will get being a university of the kind described by Sinclair Lewis in his novel Arrowsmith. Lewis describes "Winnemac University" as being ". . . a mill to turn out men and women who will lead moral lives, play bridge, mention books, though they are not expected to have time to read them.

"It is a Ford Motor Factory, and if its products rattle, they are beautifully standardized, with perfectly interchangeable parts. Hourly the University of Winnemac grows in numbers and influence, and by 1950 one may expect it to have created an entirely new world-civilization, a civilization larger and brisker and purer."

PART III: Report of a Survey of Outstanding Teachers' Views on Teaching

During the spring semester of 1973, the Office of Instructional Resources interviewed twenty professors—identified by the HOPE, H. Bernerd Fink, and AMOCO awards as outstanding teachers in the various departments of the University community—for their reaction to six questions:

1. Are teaching and research alien?
2. What are the intrinsic rewards of good teaching?
3. How can the university aid teaching?
4. Why do you like to teach?
5. How do you evaluate your teaching?
6. What behaviors and teaching methods do you utilize in the classroom?

Responses are summarized below.

1. *Are teaching and research alien?*

Respondents generally agreed that good teaching and research were complementary, mutually reinforcing activities. Several considered "the best researcher is not the best teacher" a false stereotype.

Teaching engenders ideas for research. Research findings, returned to the classroom, deepen and broaden understanding by both student and researcher. Research remains the essential ingredient to keeping contemporary with new ideas and methodology in departmental fields. Professors in areas of human development and education found research dealing with the learning process an absolutely necessary component of good teaching.

Collective opinion showed time limitations often dictate sacrificing one activity to benefit another. Even with recent attention devoted to better teaching methods, the promotion system favors the research obligation. Respondents observed that faculty capable of college or university positions ought to be able to handle both activities with relative success.

2. *What are the intrinsic rewards of good teaching?*

Those interviews expressed most frequently these gratifying experiences from teaching: a sense of accomplishment, a sense of responsibility for having aided in shaping a student's career, the feeling that one's work is appreciated and the thrill of having instilled a new idea in a student's mind. As one respondent stated, teaching is "the best job in the world."

3. *How can the University aid teaching?*

Of suggestions received, many professors believe financial inducement the primary encouragement to improved instruction. Besides rewarding good teachers with higher salaries, more grant money could be devoted to innovative teaching. Teaching chairs created in various departments could stimulate teaching excellence.

Others encouraged the University to provide additional teaching aids and materials, expertise on new methods, and technical assistance in use of video-taping and audio visual equipment.

Perhaps the University could better use present talent by fitting teaching situations to professors' talents rather than vice versa. If manpower is available, could professors be allowed to choose the time of year they prefer to teach and the class size they are best equipped to handle?

Further, departments could encourage more frequent internal and related external personnel exchanges. Departments might require a group dynamics course for all teachers. And departments should require teaching experience of all Ph.D. candidates.

4. *Why do you like to teach?*

Three major concepts were categorized from various responses.

First, teaching offers the chance for personal intellectual growth and development. Self awareness is imperative for clear communication to others. Actually, the teacher becomes a student engaged in the same learning process effecting students.

Second, teaching satisfies certain psychological and ego needs for creative freedom, flexibility, variety, service, accomplishment, and power to try to convince people of ideas which might alter their behavior.

Third, the teaching environment offers a life style of maximum enjoyment. Teachers find it exciting amid young people whose minds grapple with new ideas and new information. Good teachers have great enthusiasm for their subject matter. Aided by the teacher, the interaction of student and subject matter can be an experience of "sheer enjoyment," to quote one respondent.

5. *How do you evaluate your teaching?*

Most professors use the Curriculum and Instruction Survey to record student reaction to classes. Some expressed dissatisfaction with this evaluation tool, however. And most use additional evaluation such as informal conferences, written student comments throughout the semester, and regular examinations. Some respondents recommended departmental evaluation forms to measure achievement of goals inherent to particular academic fields. Students evidently can hide neither boredom nor interest, for faculty frequently mentioned that students' faces give the best indication of success or failure of class activity.

It was recommended that teachers could utilize videotaping to self-evaluate their teaching effectiveness.

6. *What behaviors and teaching methods do you utilize in the classroom?*

As expected, many different types of activities were mentioned, including the traditional panel discussions, research projects, team teaching, tutorials and individualized instruction. Recent trends indicate increased use of gaming and simulation exercises, contracts and criterion-referenced testing. Of particular interest, open office policies were cited frequently.

PART IV: Teaching Skills

Discussions of:

- Lecturing
- Set Induction
- Closure
- Discussion Skills
- Use of Questioning in Discussion Groups
- Probing Questions
- Higher Order Questions
- Higher Order Questions: Relation to the Taxonomy of Educational Objectives and Examples

On the Acquisition of Teaching Skills

Lecturing

Lecturing is much misunderstood and much maligned. Yet, when done correctly, it is quite helpful to students and is appreciated by them. Lecturing's negative connotations have arisen through misunderstanding about how and when to use the technique.

Basically, lecturing is a presentation activity with attention focused on predefined content. It usually involves several teaching skills: set induction, closure, reinforcement, use of questioning techniques and varying the stimulus. Although the teacher plays the dominant role, there are opportunities for student participation.

Lecturing is useful for the following teaching objectives:

1. **Lectures convey information.** This is especially true with information not otherwise accessible to students. For example, a lecturer may have access to books, articles, people or places (those visited on sabbaticals, leaves of absences, etc.)

2. **Lectures review and reinforce previous work.** The teacher's unique way of reviewing can reinforce student understanding of material through simple review or repetition of main points. Reviews provide the teacher opportunities to bring in more examples, references, anecdotes, etc.

3. **Lectures synthesize many sources.** Through synthesis, teachers can save students time and trouble required to read all available sources and can convey information not otherwise available. Synthesis provides students an overview or general insight into topics which otherwise might come very slowly from extensive reading of available sources.

4. **Lectures convey enthusiasm.** This touches on the techniques of set induction. The lecture itself, primarily a one-way presentation from teacher to student, can be an exciting introduction to material or an exciting presentation of material in its entirety. A stimulating presentation will reinforce students' understanding of what they already know and motivate them to delve further into a subject.

Lecturing, then, is a way of presenting material in an interesting and motivating manner, when acquisition of information is a primary objective. Because lecturing is a one-way activity, students are necessarily going to be rather passive. Thus, when the goal of the lesson goes beyond acquisition of information and seeks to get the student involved in learning, the lecture must be complemented by other activities. Then, the lecture introduces and is followed by activities in which the learner takes part actively—discussions, laboratories, writing papers, field trips, etc. The reason: for a person to learn anything, he must become involved with it. For example, if a person wants to play golf, he must play golf. He cannot read about golf and expect to become a good golfer. In a similar way, a teacher cannot simply lecture about good writing. Students must be given the opportunity to write.

To enable students to reach established lesson goals, lecture plus complementary teaching methods may be useful for the following activities:

1. When instructional goals involve the application of skills.
2. When instructional goals involve changing of attitudes or behaviors.
3. When information presented is to be retained by students for a long period of time.
4. When lecture material is very complex or abstract. Students may need an opportunity to apply it and use it so they can learn the higher order relationships of the materials.

Characteristics of an Effective Lecture

In planning a lecture, a teacher should consider several points.

One significant concern is the disposition of the audience—the listeners' abilities, interests, personalities and motivations. Verbal communication must be interesting and understandable. A vocabulary appropriate for college freshmen may need adjustments to students of graduate level. Anecdotes too, may differ. Motivation for students in general chemistry may be markedly different from that of the student preparing for medical school.

Another audience consideration relates to the effect of the time of year or time of day on the student's propensity to listen. The temper of a classroom the day before a mid-term exam may differ from that the day after a long vacation. Such information needs to be acknowledged in planning the length of a lecture, the amount of material to be covered, and the degree of difficulty.

A third aspect considers the pace of the lesson. The lecture should include periodic pauses for students to assimilate information, revise notes or ask questions. While preparing the lesson plan, a teacher should consider when to vary the stimulus. This change of pace may simply be a variance in pitch, loudness, intensity or speed of delivery. Or change may extend to the use of visual devices such as blackboard, overhead projectors, films or film-strips.

With regard to the speed of delivery, while presenting a particularly difficult concept, the lecturer may slow down the presentation. During review, material may be skimmed at a fairly rapid pace.

Lecture length needs consideration. Even a good lecturer with an interesting topic tends to take too long. The attention span of most adults is about 20 minutes, so that in addition to pacing the lecture, a pause after about 20 minutes should be allowed. Lectures should be kept fairly short—from 30 to 40 minutes at the most. Learning begins to diminish after 15 minutes, and in about 45 minutes interference occurs and the learner may begin to lose much of what was acquired earlier without carefully taken notes.

Perhaps, the simplest test of lecture appropriateness asks whether or not the subject matter could have been presented more efficiently and usefully in a book or in some other manner.

Set Induction

The goals of set induction are 1) to establish a coherent, cognitive frame of reference for students so they know what will happen and what is expected of them and, 2) to increase involvement in a pedagogical activity by stimulating interests and facilitating abilities to interact in the lesson.

Frame of Reference. Set induction is a process by which a teacher indicates the purpose and direction of a particular lesson to general course content. In so doing, the teacher intends to clarify the purpose and nature of specific activities within the overall subject. Set enables students to plug in and become more interested in the lesson.

The term "set," or "advanced organizers,"[1] refers to the establishment of rapport or cognitive relationship of pupil-teacher-content in order to obtain immediate involvement in a lesson. It is a frame of reference within an entire lesson or unit. The teacher, interested in students seeing the nature, intent and direction of activities to follow, hopes these become more understandable and intrinsically interesting.

Although set induction may occur at various times, it is most frequently used to begin a lesson, semester, unit, lesson sub-section, or student panel discussion; to introduce a film; or to precede a homework assignment.

However, set induction not only deals with what is to come in the present lesson, but also the content of previous lessons. It ties present learning and learning activities to prior learning, enabling students to see where the present lesson fits into the overall plan and purpose of a course since each activity is part of a larger context and should not be isolated. Thus, set induction helps achieve a smooth transition from past knowledge to new knowledge.

Also, when used to clarify lesson purposes and procedures, set induction prevents confusion and vagueness, a state of mind which may lead to boredom and frustration.

Increasing Student Involvement. Motivation is often difficult in lessons, particularly in lectures, because it is difficult for teachers to point out the relationship between present performance and future rewards.[2]

Set induction helps get students involved in a lesson. A person involved becomes more committed. More interest generates more willingness to give time and energy. Thus, students become more interested in learning course material. Just as a person who wants to learn to play golf must actually play golf, and a person who wants to learn to write must actually write, likewise, a student who wants to learn about European History must choose a time period, read about it, and become involved with those events, personalities, theories, etc.

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[1] Ausubel used the term "advanced organizer." See D. P. Ausubel, "Learning by discovery: rationale and mystique," *Bulletin of the National Association of Secondary-School Principals,* 1961, 45, 18-58.

[2] This concept is embodied in a theory developed by Arthur Stinchcombe in his book, *Rebellion in a High School* (Chicago: Quadrangle Books, 1964).

Hopefully, set induction will enable the teacher to point to the intrinsic value of a lesson or course to students, thereby conveying why it is worth getting involved with the coming lesson. However, some instances may prove very difficult to connect clearly between the student's present performance and future rewards. In such cases, set induction may need to emphasize extrinsic as well as intrinsic rewards. Extrinsic rewards can help involve the student with the subject matter. Then, hopefully, the student will see the intrinsic value of the subject. In other words, getting the person into the situation is the first task. Thus, if it takes red stars or the promise of film strips and films, etc., to get a student interested, it may be appropriate, so long as the teacher intends to shift the student from an extrinsic reward schedule to intrinsic rewards later.

How to Construct a Set. In planning set induction, there are two phases to keep in mind. The first, or "pre-active"[3] phase, involves activities the teacher undertakes before the lesson. The "inter-active" phase involves activities at the beginning or during the lesson.

In planning, the teacher initially should consider the "givens," that is, the conditions, goals and needs of the classroom, teacher and students. Givens include:

1. Information about the *subject*—the curricular goals and content.
2. Information about the *teacher*—for example, a teacher's planned absence the following week should be reflected in his plans.
3. Information about the *student*—ability levels, prior experience, personal characteristics, etc.—all things affecting student interaction with the subject and the lesson. The amount of information the teacher needs about a student and the appropriate means of getting it involves an important teaching skill.
4. Information about the *classroom* setting—the kinds of equipment, chairs, etc.

Utilizing information from these four sources also helps the teacher clarify personal objectives for forthcoming learning activities. This is perhaps as important as the clarity of the activities to students, because if the teacher is aware of and confident about what is going to take place, it will be much easier to keep teacher activities and student activities directed to those ends. Serendipitous happenings can more likely fit into the overall lesson, rather than cause diversion or regression.

Because set induction is primarily based on objectives, these deserve careful attention. Set induction is the place where objectives are first exposed to the students and provides a structure by which students work toward objectives. In planning objectives, it might be useful to make two columns on a sheet of paper and fill them out according to the following schema: column one, student objectives; column two, teacher objectives or teacher procedures, with perhaps the phrase "by means of the following I will help students reach their objectives." In this way the teacher can distinguish between procedural activities which are actually not cognitive objectives and those things which are the real intent of the lesson, that is, the concepts or ideas that students are to be exposed to. In writing objectives, the teacher may wish to differentiate between cognitive objectives and affective objectives. Of course, it is entirely appropriate to develop with students their particular roles in a course and their responsibilities in terms of lesson assignments.

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[3] "Pre-active" is attributed to Philip Jackson, *Life in classrooms* (Chicago: Holt, Rinehardt and Winston, 1968).

Making the set induction is the teacher's responsibility, but certainly the students may participate. Since the goal is to get students interested in and knowledgeable about the subsequent learning activities, their participation at the beginning of the lesson would be advantageous.

Audio-visual aids which implement the set may be decided at this time.

In writing out procedures or points to make during set induction, the teacher might make two columns: one, the activity; and, two, what is needed to carry out the activity—who is to do it or how it is to be done (for example, audio-visual aids, etc.).

Assessment of the Success of the Set Induction. In assessing the usefulness of the set, the teacher may carry out the following kinds of activities: 1) ask the students if they understood the objectives and plans set out by the teacher and/or by themselves, 2) observe the student interest level—an overall impressionistic and intuitive assessment, but nonetheless, valuable, 3) determine if students recognize the relationship between content forthcoming and the main body of material previously discussed. At the end of the unit, the teacher's assessment of student performance should reflect how well the unit succeeded, including, in some part, the usefulness of the set induction.

Additional Characteristics of Set.

1. Set induction should use some key terms to be used in subsequent presentations. This alerts the student to hearing them the next time in the lesson and provides the connection between the introduction and the body of the activity. It provides familiarity with terminology and concepts used in the lesson. In other words, it helps construct a framework on which to build subsequent knowledge.
2. Set induction can be written on the board, for example, or on a ditto handout to provide a visual framework for the student.
3. The teacher may wish to give vocal or physical emphasis to important points or words by his inflection, pauses, or gestures.

With regard to tying a lesson to previous material, phrases such as "you will remember in yesterday's class, Sara, that we talked about. . ." or "Bob, you remember what Sara said yesterday. . ."

At the end of set induction, students should be aware of what activity is to take place, informed about how they will learn from it, and how their performance will be assessed at the end of it. Set induction establishes a framework that facilitates greater ease of and greater productivity from the subsequent teacher-class interaction. It is both a cognitive and an affective process which gives students a direction for what is to come.

Closure

The skill of closure is complementary to the skill of set induction. In addition to summarizing the activities and conclusions that have gone before, as in a lesson, unit or semester, closure enables the teacher and class to tie the content just completed to work previously done and/or work to follow. In this way, the student is encouraged to see the relationship between a completed part and the larger body of work. Thus, there is no time stipulation about closure. Closure activities may take place five minutes into a lesson, at the end of fifteen minutes or at the end of a lesson period. Closure is appropriate whenever a unit of instruction has been completed. Different types of closure may vary between those ending a brief instructional period as compared with those ending a semester or a year.

Characteristics of Closure:

1. Closure ensures that students have understood the purpose of the unit and its relation to overall goals of the course. Therefore, although the teacher usually plans closure activities, students should be given opportunities to participate in order to reinforce learning.
2. Closure provides a synthesis of principles and concepts of one unit with those of previous or forthcoming units, thereby helping students generalize and transfer their learning to new situations.
3. Closure permits the teacher and students to identify any uncertain aspects of the completed unit and to provide concept clarification.
4. Closure provides an opportunity to suggest additional materials and activities for students especially interested in the topic.
5. Closure provides a reinforcing function in the sense that it allows the teacher to reward the students' learning and their interest in the unit. Teachers help students to recognize their accomplishments and to perceive teacher approval of these accomplishments.

Discussion Skills

The use of discussion sessions in university teaching has been recommended enthusiastically for many, many years. The technique holds a favorite place for those who reject the formality of the lecture in favor of the more personal nurturant atmosphere of a teacher and several students discussing topics together. The problem, however, is that although the intent is to attain a nurturant, positive atmosphere, the actions taken by the teacher are often inadequate or even dysfunctional to such goals. In other words, it is not enough simply to reject the seeming formality and impersonality of lectures in favor of a more person-oriented method. Good intentions are not enough. There must be some carefully considered and planned alternatives to the lecture if the discussion group is to be useful to students' personal and academic growth.

It all goes back to the assumption one makes about the nature of teaching. The assumption, discussed previously, is that there is no such thing as the all around best teaching method, but rather there are specific approaches which can be chosen when given certain goals. It is not a question of the lecture versus discussion method but rather one of "when is each appropriate?" A lecture may be more important, more person-oriented and more positive if carried out well, than a poor discussion.

The following describes basic procedures and significant factors to consider in leading discussion groups.

First, as with all educational activity, the teacher must carefully plan for discussion. This may seem unnecessary or even dysfunctional to the idea, but in truth, a good discussion leader will spend much time planning or anticipating the kinds of topics likely to be brought up. The leader not only considers the class as a general unit, but also considers means to allow specific individuals to participate and be rewarded for doing so. This emphasizes a fundamental skill in leading discussion groups—reinforcement, which gives a person a chance to participate and rewards both the effort and contribution to the activity.

Among anticipatory factors for the discussion group's intent and direction, consider the following:

1. *Group size.* The larger the group, especially beyond eight members, the more non-participants there are likely to be.
2. *Grading techniques.* Are students graded for simple participation or for numbers of participations? Quantity scoring produces competition to speak, precludes some speakers and deters careful listening. It is probably better not to evaluate people on the number of times they contribute in discussion groups.
3. *Instructional leadership.* Remember, the instructor performs the discussion leadership role, perhaps with limited commentary, and should always be ready to alter, unobtrusively or overtly, discussion direction if divergences are not useful.
4. *Discussion-dominating students.* Instructors should anticipate how to handle students who tend to dominate classroom discussions at the expense of those who might otherwise participate but are hesitant to do so. Discussion gives students a chance to interact directly

with, to become involved in and to learn more about the subject matter. It is not simply a courtesy to allow hesitant students to participate, it is a necessity.

5. *Instructor discussion behavior.* The leader should avoid interjecting personal ideas or answers which could possibly reduce the student's feeling of discussion freedom. They might become less willing to participate, thus diminishing the discussion's value. If instructors carefully consider their objectives for the discussion, their role as leader should become clearer and their discussion behaviors are less likely to be inappropriate.
6. *Student preparation.* The instructor should anticipate ways to ensure student preparation for discussion. Spontaneous reactions and ideas are not enough. Valuable discussions require participant awareness of concepts to be discussed. Thus, responsibility for discussion preparation extends beyond the teacher to the student. This fact should be communicated to students.

On the Use of Questioning in Discussion Groups

by Jerry Hutchison and Phil McKnight

Research on teaching methods at the college level has supported the hypothesis that classes which feature discussion are often preferred to traditional lecture techniques.[1] Although facts and information can be given with greater efficiency in a lecture, evidence shows that discussions may be better for transferring more complex cognitive and attitudinal objectives.[2] Teachers should plan their classes accordingly.

This advice, cogent as it is, poses a problem to many college teachers. Having learned under the lecture system, and because they are at ease in such a structured setting, they are predisposed to using it. Furthermore, the guidelines for effective lecturing are fairly straightforward and can be acquired by most with practice. The lecturer who is articulate, enthusiastic, well organized and who uses attention-getting devices, illustrative examples, periodical summaries and a variety of media, and who is free from distracting mannerisms will probably succeed in the lecture hall.

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[1] C. L. Bane, "The lecture versus the class discussion method of college teaching." *School and Society,* 1925, *21,* 300-302, and J. E. Casey and B. E. Weaver, "An evaluation of lecture method and small group method of teaching in terms of knowledge of content, teacher attitude, and social status." *Journal Colorado-Wyoming-Academic Science,* 1956, (4), 54.

[2] A. M. Douglas, "An experiment in seminar methods." *International Journal of Electrical Engineering Education,* 1970, 4 (1), 19-22, and C. A. Erskine and A. Tomkin, "Evaluation of the effect of the group discussion method in a complex teaching programme." *Journal of Medical Education,* 1964, *38,* 1036-1042.

Unfortunately, the guidelines for establishing the appropriate discussion setting are not so easily applied. Although college teachers are advised to be sensitive facilitators and mediators, most have received little training which will allow them to utilize these recommendations effectively. For example, what happens when the teacher, committed to implementing this method, finds himself before a group of students who expect the normal 50 minutes of lecture information? Some instructors begin with ten minutes of well chosen remarks, then abruptly stop with a ploy designed to encourage class participation—the asking of a "provocative" question. However, all too often the question is either extremely narrow or completely open-ended. A sample of the former is: "What is the correct solution to this problem?" and the latter, "What are your ideas on the subject?" An awkward and embarrassing pause often follows while the instructor waits for some reaction from the students.

What are the reasons for such pauses? For one, students may be uncertain about the teacher's purpose in asking such questions. For example, the students may think "This is not a learning experience, this is merely a test." Or, "The teacher already has a preplanned answer. Why gamble on an isolated solution when it is much safer to remain quiet?" A frequent thought is "If I attempt to answer that question, my peers will think I am polishing apples. If I am correct, they will silently ridicule me." Or perhaps the class has seen what may happen to those who volunteer information which may not support some teachers' answers or beliefs.

College students have twelve to eighteen years of experience in this setting. Teachers' cynicism, ridicule, sarcasm, and belittlement of wrong answers may have taught students to avoid responding at all. These problems should indicate the importance of a teacher clarifying the purpose of his provocative question, and of his willingness to accept some contributions in a positive manner. Without such steps, the only effects of the question may be that when an answer is given (1) the brightest or best prepared students have been discovered, (2) the instructor's ego has been gratified by hearing an agreeable response, and (3) the void has been filled by someone other than the instructor speaking, thus giving him a moment of respite.

Unfortunately, such answers (often rhetorical) may have another negative effect. They may come while many students are still thinking about the question. They may still be reflecting upon the question when the instructor moves to a new topic. Thus, rather than being a learning experience, the exchange has been a testing experience—where "thinking fast under pressure" is rewarded. Or worse, a situation where answers which merely "fill the void" are rewarded. Consequently, class members may begin to feel alienated or inferior, predicting quite accurately that they are likely to be outsiders in future discussions. However, the discussion leader who gave those holding a minority viewpoint a greater voice was able to upgrade the discussion and its end product (in this case the solution to a mathematical problem).[3]

The lack of time for students to construct a reasoned response and to respond at length are perhaps the most unfortunate aspects of cursory question and answer sessions. Premature responses tacitly encouraged or rewarded by a teacher preclude higher order kinds of deliberations which are essential to learners' becoming involved with the concepts under discussion. When teachers cut off students' attempts to share their carefully laid out rationale, they are depriving these students of the opportunity to reinforce their understanding by actively utilizing the concept (s).

There is, of course, an understandable tendency to fill the silence after a question. Most people feel some discomfort during a prolonged pause. It is analogous to taking an essay examination and abhoring the silence of the blank page. Some students rush to fill in such blanks as if they were a vacuum. Unfortunately, such immediate responses may fill the vacuum with inappropriate information. For such people, "uncertainty training"[4] may be the means to overcome this tendency so that more rational answers may be developed and presented by the learner. Students who have attained this skill of pausing before responding may be reluctant to respond immediately to a question, knowing that a premature reaction may be incorrect. For students who have not learned to delay their responses until they have been carefully constructed, rapid fire discussions continue to reinforce impulsive reactions rather than cogent responses.

For useful discussions or interactions then, it is apparent that a nurturant, accepting climate must initially be established where students feel free to ask questions and to deliberate. For such a climate, the instructor must become more aware of the students' responses and of his own reaction to them. Wallen cites skills which appear to facilitate such awareness.[5] Their application in a classroom setting may help to establish the proper atmosphere for productive, open discussions. They are techniques in the sense that they are models for behavior which can be systematically practiced in a classroom.

One skill is that of *paraphrasing*. Paraphrasing involves restating what another person has said, using one's own words. It is a communication skill that implies a caring for what the other person has said, and a desire to respond with an accurate mirroring of his thoughts. Useful lead-ins to paraphrasing are, "I understand you said. . . ."

Another skill is that of *behavior description*. The skill of behavior description involves noting overt expressions and actions of other persons. For example, a teacher might strive to be sensitive to student feelings by scanning the room for visual cues to such feelings. Video tape recordings made of student expressions support the notion that such expressions provide good reflections of a teacher's effectiveness.

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[3] N. R. F. Maier and R. A. Allen, "The contribution of a discussion leader to the quality of group thinking: The effective use of minority opinions." *Human Relations,* 1952, *5,* 277-288.

[4] J. E. Sieber, "Overcoming secondary ignorance. Learning to be uncertain." Research Memorandum No. 17. Unpublished manuscript, Stanford University, 1968.

[5] J. Wallen, in Northwest Regional Educational Laboratory, *Interpersonal Communication* (Tuxedo Park, N.Y.: Xicom, 1969). Cited by R. A. Schmuck and P. A. Schmuck, *Group processes in the classroom* (Dubuque, Iowa: W. C. Brown, Co., 1971), pp. 96-98.

Another recommendation is that instructors provide students with descriptions of the instructor's own feelings. Expressing feelings directly places one in a vulnerable position, but it does improve feelings of trust. Verbal descriptions of one's own feelings are least likely to be misunderstood. "I am angry," or "I feel annoyed," may be preferable to saying nothing. "I feel that many of you are not prepared or interested; I had hoped for a more enthusiastic participation in this project; I have the feeling that some of you have other thoughts on your mind," are better than implying or saying "This is an inferior class."

A final technique is one of *perception checking.* This is similar to describing instructor's feelings and a kind of paraphrasing except that the teacher states his perceptions about the feelings of others. It involves interpreting feelings and internal processes rather than the words or overt behavior of others. It is tentative. It tests the climate and allows the student to confirm or alter the teacher's perceptions. It softens criticism. For instance, "I get the impression that you are confused. Are you?" is preferable to "Why isn't this discussion getting anywhere?"

Instructor awareness of students' responses and his attempt to react to them in a helpful way has been described by one of the present writers as the skill of *responsiveness,* which is defined as the ability to listen carefully to what students say and to respond in an appropriate cognitive and affective manner. Responsiveness in verbal interactions reflects the teacher's concern for establishing a reciprocal encounter or dialogue with students. The ultimate hope is that increased involvement in dialogue may increase students' opportunities to diagnose and respond to learning problems. As a teaching skill, responsiveness should also generate complementary student behavior. As students perceive a teacher's willingness to listen and respond appropriately to their contributions, students should be more receptive and responsive to the teacher's contributions. Such behaviors may be seen to reflect concern with the nature and intent of paraphrasing.

Responsiveness is composed of two complementary skills—*listening* and *response appropriateness.*

Listening is primarily a technical skill, entailing concentration by the teacher on verbal statements from pupils so that the main points of a communication can be retained. The teacher attends carefully to what he hears the student saying. He listens primarily for cognitive content, but also attunes himself to social and affective cues since presumably these also affect the instructional process. The teacher who listens carefully should thus be able to retain both explicit and implicit content and to summarize the essential meaning of a student's communication.

Response appropriateness is reflected in a teacher's replies to student communications. During the time between pupil comment and teacher response, the teacher assesses the comment and decides what reply might help the student understand the concepts being discussed. To respond appropriately, the teacher must listen both to the *content* and *intent* of a student's comments and questions for cues as to what tack should be taken to help the student increase his understanding.

Taken together, listening and response appropriateness behavior can be defined as showing observable concentration on the content and intent of student verbal behavior, followed by a verbal reply which demonstrates some effort to understand and reply to the explicit and implicit meaning of the student's comment or question. The response of the teacher may be an answer, a question, an elaboration, or a reinterpretation of his previous statement or question. A teacher may even stop group discussion to give students more background information by means of a short lecture. Finally, classroom responsiveness should be a goal for students as well. Responsiveness has been extensively treated by those involved with the Taxonomy of Educational Objectives Project. In the report of that committee's work on the affective domain,[6] two of the five categories are entitled "Receiving (Attending)" and "Responding."

Instructors' responses to students have emotional as well as pedagogical impact. A review of research on the "ripple effect"[7] in the classroom supports this idea by pointing to the negative effects of teacher responses, thereby illustrating the interdependence of elements in the classroom. For example, a teacher's control actions directed against a deviant student may ripple through and affect the entire group. A study of university students showed that students who witness teacher punitive measures toward a tardy student rated the instructor as less helpful, less likeable, less fair, and more authoritarian than did students who viewed supportive actions in a similar situation. This is not, of course, to suggest that the instructor does not need to lead the discussion, or that he should not direct for fear of being authoritarian. Responsiveness entails appropriateness of response. Obviously, the instructor should play a role in defining the issues and clarifying points raised by students. In most class settings, it is up to the instructor to set the stage for a discussion, establish parameters, and to summarize toward the end of the period. It may also be wise to interpret the discussion at several points to review what students have said so far and what direction the discussion is taking. Without a perceptive instructor, discussions often can become mere buzz sessions. They are often enjoyable but may not result in the learning experience desired by the instructor.

A teacher who attempts to be a responsive discussion leader may wish to consider the following questioning techniques for enhancing his discussions' personal and academic value for students.

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[6] D. R. Krathwohl, B. S. Bloom and B. B. Masia. *Taxonomy of educational objectives. Handbook II: Affective domain* (New York: David McKay, Inc., 1964.)

[7] J. S. Kounin, P. V. Gump and J. J. Ryans, "Explorations in the classroom management." *Journal of Teacher Education*, 1961, *12*, 235-246.

1. When questions are asked, the instructor should allow the class to pause for a few minutes of reflection before asking for responses. This procedure has value, especially where there are several alternative responses, because "the number of alternatives under consideration and the degree of unsureness experienced are highly correlated; i.e., the more choice alternatives persons consider, the more uncertainty they tend to experience."[8] Thus, for productive contemplation to occur, the student must be given enough time. However, the logic of this assumption must escape many teachers, for the length of time between a teacher question and a student response is usually only several *seconds*. Not minutes, but seconds. Yet the role of the instructor here is not that of a lecturer; he should not dominate the conversation, even though it is difficult not to, given his greater knowledge. Teachers who wish to display their knowledge base should schedule the class in an amphitheatre and devote their time to lecturing.

If an instructor is concerned about dominating a class discussion, some simple monitoring techniques can assist him in modifying his behavior. Watching a videotape replay of a class discussion can be very revealing by pointing out the time logged "on offense" by the instructor. If video equipment is not available, a student can be asked to remain apart from the discussion and to make a tallymark on a sheet of paper beside the name of the instructor each time he speaks. Marks are also made for each student contributor. The instructor may set a goal for himself, e.g., one instructor tally to six for the students. The results of the first few days are likely to reveal how the discussion is dominated by one person and make the instructor increasingly sensitive to his role in the classroom. The number of tallymarks for the instructor should steadily decrease as he becomes more responsive.

Responsiveness in question and answer periods is particularly important and yet difficult to attain because students often find it difficult, even when given time, to express themselves adequately. The instructor can be of great assistance here by encouraging them to continue their attempt. Such phrases as "That is an interesting idea; can you tell me more?" or "I think you have the right idea, can you tell us how you arrived at this viewpoint?" may provide such encouragement. Helping students to clarify their reasoning may relieve them of awkward moments, enhance learning for others, and encourage all to participate in the learning process.

2. Another means of helping students to clarify their thinking is by the use of "probing" questions, which seek to pull the student beyond an initial, perhaps shallow, answer or comment in order to elaborate, justify or clarify his initial position. In so doing, the student becomes more involved with his answer, thereby achieving greater understanding.

A key element in the above strategies is that of time; i.e., in the willingness and concern of the teacher for giving students the opportunity and time to focus on concepts and issues of interest to them. Both cognitively and affectively, time given to students is crucial pedagogically.

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[8] Sieber, *op. cit.*, *p.* 1.

3. One may ask questions that have more than one answer, e.g. "how many ways," instead of "what is the best way?" Students can be asked how they "feel" about the topic, not what they "know" about it. The answer may be the same in either case, but the question may seem less threatening and thereby lead to greater student participation. If a person is to learn, he must become involved. Questions which encourage and invite involvement and which hold no potential threat for "incorrect" involvement are a key part of responsive pedagogy.

4. Occasionally the teacher may ask questions for which he does not have an answer. Even if he thinks he has the appropriate answer, the question can be stated as a hypothesis or a hunch. An instructor will gain respect, not lose it, from occasionally admitting that he does not know all of the answers. Furthermore, with the help of the class he may arrive at the correct answer or a concensus. In so doing, he might even learn something from his students.

5. An instructor might examine the seating arrangement of his class for its effect on interaction, including responses to questions. Research on this subject[9] indicated face to face interaction between two people facilitated positive interaction. If the results can be generalized to a discussion group, they would support the arrangement of chairs or desks so that students could see one another as well as the teacher.

6. The grading procedures and policies for discussion groups might also be examined for their effect on students' willingness to participate. For example, if an instructor evaluates students partially for the number of times they contribute, the discussion may be fragmented, for the students may feel the pressure to be counted even if it means "crowding in." The discussion[10] may also be dysfunctional because of the feelings of competition engendered, as opposed to those of cooperation. In a study of cooperative versus competitive discussion methods in teaching introductory psychology, they found that the latter procedure led to greater group tension and greater tension in the individual.

Conclusion

This discussion has reviewed several areas of potential interest to teachers who use questioning methods in their discussion activities. The suggestions have touched upon several kinds of activities. One common framework[11] for these various activities looks upon them as a teacher's attempts to "develop an environment for effective learning." The information supports the existence of such an environment with research from three areas: the "ripple effects" of disciplinary techniques;[12] the activity structures effect upon child behavior;[13] and the psychological ecology.[14]

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[9] A. Mehrabian and S. G. Diamond, "Effects of furniture arrangement, props, and personality on social interaction." *Journal of Personality and Social Psychology*, 1971, *20*, (1), 18-30.

[10] D. B. Haines and W. J. McKeachie, "Cooperative versus competitive discussion methods in teaching introductory psychology." *Journal of Educational Psychology*, 1967, 58, (6), 365-373.

Even with the aid of responsive questioning techniques, a psychologically safe discussion climate is difficult and, in some cases, impossible. A few precocious, highly verbal students can intimidate the rest of a class (and often the instructor), making productive communication among students impossible. The task is difficult because it forces the teacher to examine carefully his own personality, his own shortcomings in character, and his own defensive mechanisms—all of which are the product of a life-time of experiences. For some, such criteria analysis and subsequent adjustment is impossible. Sensitivity, openness, and unbiased acceptance of others are underlying traits of teachers that often create the proper climate for discussion, yet they are not traits that can be acquired easily. For example, although there is evidence that the teacher who can laugh at himself or the topic creates a climate which is conducive to class interaction, humor cannot be forced, and the instructor who "works" at being funny is easily detected. Of course, humor by itself should not be taken as a sign of a good discussion leader, as it is only one form of evidence of a teacher's concern for and interest in his students and their cognitive and personal growth. An instructor's use of belittling sarcasm would certainly not be a sign of such concern. The point to remember here is that no single classroom strategy in itself is indicative of superior teaching. What is appropriate for one discussion leader may be entirely foreign to another's personality and/or subject goals and procedures.

In sum, the issue is not one of lecture "vs." discussion, but rather, what method is appropriate considering the goals and needs of the particular content, students and instructor. The judicious use of questions can help to create such a useful climate.

Probing Questions

Helping students become actively involved with the subject matter is one aspect of effective teaching.

It is not enough for a student to be aware of his subject matter and its importance. If a student is to have a functional understanding of it, he must engage in activities associated with that subject.

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[11] P. V. Gump, "Environmental guidance of the classroom behavioral system." In B. J. Biddle and W. J. Ellena (Eds.), *Contemporary research on teacher effectiveness* (New York: Holt, Rinehart, & Winston, 1964), pp. 165-195.

[12] J. S. Kounin and P. V. Gump, "The ripple effect in discipline." *Elementary School Journal.* 1958, 59, 158-162.

[13] P. V. Gump and R. Redl, Cited by B. J. Biddle and W. J. Ellena (Eds.), *Contemporary research on teacher effectiveness* (New York: Holt, Rinehart. and Winston, 1964), p. 165.

[14] R. G. Barker and H. F. Wright, *Midwest and its children* (New York: Harper and Row, 1955).

If an English teacher wishes to help students learn to write, that teacher must give them the opportunity to write. It is not enough for students to talk about good writing or to read good writers, because these activities do not give them a chance to write themselves and to receive feedback about their efforts. The need for involvement and practice is most understandable when dealing with behavioral activities such as speaking, or with psycho-motor skills such as tennis and golf.

The same consideration, however, applies to skills that are not so visible, because it is just as important that students be given the chance to utilize cognitive skills. If a teacher has planned a discussion about other cultures, for example, and the goal is not only to acquaint students with other cultural mores, but to bring them to a higher level of empathy and appreciation for these mores, the teacher would find it valuable to get students as involved in the discussion as possible. Through involvement comes commitment.

In a discussion group, one good way of getting people involved is through the use of questions. There are certain kinds of questions called "probing" questions that are particularly useful in getting students involved in the subject matter.

Probing questions require students to go beyond initial answers in ways that will help them strengthen their understanding of the concepts being discussed. Initial answers to teacher or student questions are often of a cursory nature largely because students have seldom been required to go beyond short answers that fill the gap left after the teacher's questions. Silence after questions is uncomfortable for both teachers and students, but particularly for teachers. Thus teachers often permit students to stop with cursory answers. Students come to see that this is the only kind of answer that is really required.

Probing questions may be open-ended or non-directive; that is, the question should solicit opinions and personal experience and encourage intuition and imagination as well as careful reasoning. Further, the teacher must convey to the student the idea that, regardless of differences of opinion, the answers will be acceptable.

The teacher should not put the student on the spot. Through the use of probing questions, the teacher attempts to get the student to make assumptions or opinions clearer to the class and clearer to himself. Students' explanations for concepts or phenomena, especially where there is no right or final answer, must be acceptable.

Evidence for the value of the use of probing questions comes from several sources, including an excellent article by Robert Hess and Virginia Shipman entitled, "Early Experience in the Socialization of Cognitive Modes in Children."[1] The authors hypothesize that the structures of the social system and the family shape communication, and language in turn shapes thought in the cognitive styles of problem solving. Without a complex vocabulary, children cannot learn as well, and the home is an important factor in deciding whether children develop a complexity of language and the ability to reason which are necessary to higher levels of thinking.

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[1] R. Hess and V. Shipman, "Eearly experience in the socialization of cognitive modes in children," *Child Development*, 1965, 36, 869-886.

The writers say that in many homes there is little or no talking, or talking in nonrational ways (i.e., ordering, incomplete sentences) and that this constitutes a form of cultural deprivation that constricts children by precluding the tendency for them to reflect and to see the rationale behind things. Instead, it leads to impulsive modes dealing with stimuli or problems, and to dealing with the immediate, not the future, or with ideas that are disconnected and not sequential. Its relevance to probing questions is that the verbal interaction in such homes is limited and cursory.

Likewise, in some discussion groups, students may be requested to answer in short, shallow ways that satisfy the teacher, but do little to enhance the learning of the student.

Probing questions, then, encourage students to go beyond the initial simplistic answers in ways that will enable them to strengthen their understanding of various concepts.

Higher Order Questions

by John J. Koran

Higher order questions are defined as questions which cannot be answered from memory or simple sensory description. This kind of question helps the students develop abstract thinking skills and requires them to go beyond the factual or descriptive answer. Higher order questions require the students to generalize, relate facts in meaningful patterns, compare and contrast concepts and principles, make inferences, and see causes and effects. They call for finding rules or principles, rather than defining them. The critical requirement for higher order questions is that they prompt students to use ideas rather than just remember them.

The key thought or word related to higher order questions is "why," for "why" requires the students to weigh the facts and make generalizations, inferences, classifications, and conclusions. In short, "why" questions require the student to go beyond the factual or descriptive answer. However, "why" and "how" questions do not necessarily demand more than memory. The question: *Why did the Civil War break out?* is only a memory question if the student is expected to repeat the answers he just finished reading in the textbook or he heard in the teacher's lecture. The salient feature of "why" and "how" questions is that they lead students to figure out answers rather than just remembering them.

Remember, also, that each student brings a different amount of knowledge into the classroom and consequently what is a higher order question for most students might be a factual question to another student. For example, asking a student to prove that two triangles are congruent might be asking a student to merely use his memory if he had already seen that particular proof elsewhere.

The following are examples of higher order questions:

1. **Asking questions for evaluations.** This is, perhaps, the higher form of higher order questions. In some respects these questions should be placed in the divergent question category for they are also characterized by the fact that there is no "right" answer. They deal with "matters of judgement, value and choice."[1] Norris Sanders states that any idea can be evaluated in two main steps.[2] The first step is to set up appropriate standards or values, and the second is to judge how closely the idea meets these standards or values. If no standards are offered or if they are only suggested then the question is classified as evaluative. An evaluative question is always somewhat subjective for either the standard cannot be proven to be correct, or the answer to the question cannot be judged to meet the criteria of the standard. In the following examples the students should be instructed to set their standards and then judge the question according to these standards.
   a. *Which of the two books do you believe contributed the most rewarding understanding of the Victorian period?*
   b. *Given equal resources, who would you rate as the more skillful general, Robert E. Lee or Ulysses S. Grant?*

2. **Asking questions for inferences.** To make an inference the thought process is deduction and the answer must follow from the evidence. In other words, an inference is an idea that follows, sometimes logically and sometimes not, from some specified premise or evidence. One type of inference question requires a student to relate new information to previously learned knowledge and to make an inference. An example of this type of question would be b. below. Another type of inference question is one in which the student is asked to infer a reason or a motive for the evidence of a story being the way it was. Question a. below is an example.
   a. *Why do you suppose the author places the setting in the South rather than in the North?*
   b. *If the temperature of the gas remains the same, but the gas is taken to an altitude of 4,000 feet higher, how would the pressure of the gas react?*

3. **Asking questions for comparisons.** In a comparison question a student is asked to determine if ideas are similar, dissimilar, unrelated, or contradictory. There are many different kinds of comparisons that can be

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[1] James J. Gallagher and Mary Jane Archner, "A preliminary report on analyses of classroom interaction," *The Merrill-Palmer Quarterly of Behavior and Development,* 1963, 9, 138.

[2] Norris Sanders, *Classroom questions: what kinds?* (New York: Harper, Row, and Co., 1966), pp. 141-143.

made. The simplest is to compare whether two or more ideas are the same or not. Another tests the degree of similarity between ideas. A third asks the student to relate sets of ideas on similar points. Example a. is an illustration of this kind of question. But as Norris Sanders declared, the most challenging comparison is where the student is free to choose the topics on which general ideas are to be compared. An example would be for a student to read Montesquieu and discuss how he influenced our Declaration of Independence.

a. *Compare the life cycle of the bumblebee with that of the ant.*
b. *Compare the similarities and differences of Lincoln's Gettysburg Address and Pericles' Funeral Oration.*
c. *What is the connection between Social Darwinism and the Supreme Court actions of the late 19th Century?*

4. **Asking questions for concept and principle understanding.** A concept is defined as a classification of events or objects which have common characteristics. A principle is defined as the relationship between two or more concepts. Teachers can test a student's understanding of a concept or a principle by asking him to use it in a different context than that in which he learned it. Otherwise the teacher is not sure that the student truly understands it or has just memorized it in the original context. Since concept and principle understanding is a desired goal this type of question is an essential one for teachers to ask.

a. *How was Gresham's Law demonstrated during the Weimar Republic of Germany?*
b. *Can you think of another example which fits this definition?*

5. **Asking questions for problem-solving.** Questions for problem-solving require the student to use previously learned knowledge—facts, concepts, principles, generalizations—in order to solve a problem which he has never faced before. Questions of this nature require that the student see relationships between his knowledge and the problem in order to solve it. Often these questions require a great deal of creativity in order to see a different use for an object or a different application of an idea. One of the difficult tasks in problem-solving that the student faces is to select what knowledge and skills that he possesses which will help him with the solution. Students often do not know where to begin or what knowledge will be helpful. Because of this the teacher must often give hints or directions to the student when they are first practicing this skill.

a. *Given this information, how would you go about solving the food shortage problem?*
b. *Can you prove that these two triangles are congruent?*

6. **Asking questions for cause and effect.** These questions require a student to perceive relationships between events and persons, objects, ideas and other events. They ask the student to look for the link which connects the events with persons, objects ideas, or other events.

a. *If I were to heat this bimetallic bar, what would be the result?*

b. *If the Federal Reserve Board were to lower the discount rate, how would this affect an inflationary trend?*

c. *How would a prolonged steel strike affect your father who is a painter?*

The kinds of questions written above are designed to stimulate students to go beyond the specific factual level of thinking in order to generalize, infer, evaluate, and perceive relationships. Creative use of these types of questions can bring alive a classroom which might otherwise be dull. A teacher should know the type of thinking he wishes to stimulate, and should select the proper kind of question which will succeed in achieving that goal. At first it will be a painful process for the teacher, whose mind may go blank when he considers what question he should ask to achieve his goal. But practice combined with genuine study of his questioning techniques will eventually result in a more versatile and more effective teacher.

Higher Order Questions: Relation to the Taxonomy of Educational Objectives and Examples

The purpose of Higher Order Questions is to elicit abstract thinking (i.e. a higher order of cognition) by the student. Such questions are closely related to probing questions, if not overlapping. Probing questions can be seen as helping students reinforce their understanding at one cognitive level whereas higher order questions encourage a transition to a higher cognitive level.

There are several ways of describing higher order questions. One way is to consider them in light of the taxonomy of cognitive objectives.[1] In this schema, three categories of questions are roughly defined. These are:

1. **Lower Order Questions:** Questions which appear to be asking for recalled information or ideas, simple descriptions or unsubstantiated opinions.
   a. *What is Newton's Third Law of Motion?*
   b. *What can you see out of the window?*
   c. *Did you like that film?*
2. **Application Questions** (corresponding to the Taxonomy of Educational Objectives' categories of Comprehension and Application): Questions which appear to be asking pupils to demonstrate their understanding of concepts, rules, or relationships, usually by dealing with specific examples. Such questions demand that new information be organized in terms of concepts which the teacher assumes, or hopes pupils have already acquired.

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[1] Benjamin Bloom, et al., *Taxonomy of educational objectives* (New York: David McKay, 1956).

a. *What problems similar to this have we met before?*
b. *What does this sentence mean?*
c. *How would you solve this equation* (one of a type already discussed)?

3. **Synthesis Questions** (corresponding to the Taxonomy of Educational Objectives' categories of Analysis and Synthesis): Questions which appear to be asking pupils to make distinctions, specify relationships, or generally formulate new concepts not explicitly formulated before.

a. *In what important ways do these newspapers differ?*
b. *Can you, then, say what characteristics mammals share which differentiate them from other organisms?*
c. *Can you summarize what the writer is trying to say in this poem?*
d. *What is common to all these problems?*

The following examples of lower and higher order questions are provided by Karen Claus,[2] who prepared them for teacher trainees. Note the correspondence of the types to the different categories of the Taxonomy of Educational Objectives.

Description and Examples

I. Low-order

1. Memory

A memory question is framed in such a way that if the student remembers information presented to him, he will know it applies to the question. The greatest problem in this category is how to determine the knowledge that is worth remembering and how to structure learning so that the emphasis is really on the knowledge judged most important.

a. Fact questions stress knowledge that comes from direct observation.
What color is the ball?
How many people live in San Jose?

b. Definition questions aim at designated meanings of words.
What does "constitutional" mean?

c. Generalization questions stress the common characteristics of a group of ideas or things.
What do all of the white houses have in common?

d. Opinion or value judgements stress the expression of a judgement of quality.
Are these the best strawberries you've ever tasted?
Which story do you think was best?

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[2] Karen Claus, "Intern instruction: the skill of higher order questions," Stanford University Microteaching Program, 1967.

II. Higher Order

2. **Translation**

   Translation is the intellectual process of changing ideas into parallel forms. The student identifies one part of the original communication at a time and translates it into the new form.

   a. Translation of ideas from one communication (textbook) to another (the student's own words).

      Johnny, can you say that in your own words?

   b. Translation from words to pictures.

      Can you put your fingers on the place where the miners mine the coal?

      What idea that we studied in this unit is close to the main point the artist makes in this cartoon?

   c. Students compose a picture.

      Can you draw a picture of "democracy" at work?

   d. Paraphrased sentences. The teacher rewrites difficult paragraphs into similar language and asks students to find the sentences or paragraphs in the reading that say the same things.

      Can you find the sentence in our reading that tells us the same thing?

3. **Interpretation**

   The essential characteristic of interpretation is that the student *relates* facts, generalizations, definitions, values, and skills. To relate means to discover or use a relationship between two or more ideas.

   a. Comparative relationship questions ask for evidence to support an answer. The student determines whether ideas are identical, similar, or different, unrelated or contradictory.

      1) Students are asked whether or not two or more ideas are the same or different:
         Is the climate of Rockport, Maine, different or the same as that of Frostproof, Florida?

      2) Degrees of similarity are asked:
         Which two communities are most similar in the amount of rainfall each year? Frostproof, Florida; Window Rock, New Mexico; Greenville, Mississippi.

      3) Relate two or more sets of ideas on specified points:
         Compare Greece and Rome with regard to architecture.

      4) Leave it up to the student to determine the topics which are comparable:
         Compare the Articles of Confederation with the United States Constitution.

   b. Relationship of implication questions seek to encourage deductive thinking. An implication is an idea that follows from specified evidence.

    1) Inference of a logical implication:
    True or false: The law of comparative advantage would probably lead a nation to produce fewer kinds of goods but greater quantities of each.
    2) Introduction of a new concept which is probably unknown to the students. The thought processes require relation of information newly gained to information previously learned.
    3) Interpretation of films and speeches.

c. Relationship of an inductive generalization to supporting evidence. An inductive conclusion is drawn when observations of many members of a class of things indicate that they all have a common characteristic. The conclusion is that all members of that class have that characteristic.

d. Relationship of a value, skill or definition to an example of its use. The student is given a value, skill, definition and asked to identify or compose an example of its use. The student is not asked to make an evaluation but rather to recognize the use of the value.

e. Quantitative relationships utilize statistical information to draw conclusions. Graphs and charts are often utilized in this type of question.

4. **Application**

These questions deal with knowledge which has explanatory or problem-solving power. They also deal with the whole range of ideas and skills rather than solely with the parts. Application questions include a *minimum of instructions or directions.* Children are asked to apply the knowledge they have previously learned. A research paper or oral report is an example of an application of previously learned skills. Operating a motion picture projector is another example.

How would you do this . . . ?

5. **Analysis**

The distinctive feature of the analysis category is that it requires solutions to problems in light of conscious knowledge of the parts and processes of reasoning. The problem-solving method is utilized in this type of question—the pupil is asked to arrive at a conclusion through a logical procedure, an outline. Analysis questions are often preceded by instruction in the form of reasoning required by the question.

Analyze the reasoning in these questions:
Why has Russia an abundance of natural resources?
Why does the queen ant need workers to help her lay her eggs?

6. **Synthesis**

The questions asked in this category encourage students to engage in imaginative, original thinking. Synthesis thinking is closely tied to the class atmosphere that rewards originality. Great freedom is allowed students to synthesize information in quest of solutions. *You have experienced some recent tests involving synthesis—divergent thinking.* Here is another example:

In this test you are to read a story and then write as many interesting titles for it as you can.
You will have two minutes.

7. **Evaluation**
Questions in this category require students to perform two major steps in evaluation. The first is to set up appropriate standards or values and the second is to determine how closely the idea or object meets these standards or values. Like the process of analysis, the process of evaluation requires preparatory instructions. These instructions fall mainly in the memory and interpretation categories. The nature of values which are important to the question should be clear. Consideration of controversial issues falls into this category. Also, "What would you do if . . . ?" type questions require some evaluation.

Is the book written well from a literary standpoint?
Is the author qualified to write on the subject?

On the Acquisition of Teaching Skills:
The General Learning Corporation Films

Thirty-four short, color films of elementary and secondary teachers demonstrating seventeen of the Technical Skills of Teaching have been acquired by the School of Education and the Office of Instructional Resources, for previewing and classroom use. This description is intended to better acquaint potential users of the films with the assumptions and concepts underlying the preparation of the films in hopes that they will be able to better utilize them for the improvement of teaching. A list of the film titles follows the discussion.

The General Learning Corporation Films of the Technical Skills of Teaching were prepared to provide models of various teaching skills in order to help teachers at various levels extend their range of communication skills. Carefully planned and prepared, they are intended to give the viewer a succinct, comprehensive description of the strategy portrayed.

The Technical Skills of Teaching were initially developed at Stanford University in order to provide a focus for trainees and their supervisors during microteaching sessions. Both supervisors and trainees (interns in a fifth year Master of Arts in Teaching program) felt that their reviews of videotaped microlessons lacked direction and focus; that there would be value in providing something more definite to look at and talk about. It seemed logical that the "something definite" be teaching skills common to various situations. Another impetus to the development of such skills came from a concern that Interns become acquainted with teaching behaviors in a more productive manner than is normally done. Trainees often acquire their concepts of teaching skills from observing "master" teachers in regular classrooms. According to Berliner however, such a training program is inadequate because:

> (a) it places the novice teacher in a situation where both "good" and "bad" teaching behavior occurs; (b) the novice has to decide for himself, without an experienced supervisor close by, what teaching behaviors should be emulated. Sometimes poor teaching habits are learned and sometimes the significance of certain exemplary behaviors are missed; (c) there is little opportunity for immediate practice of those teaching behaviors deemed important; (d) observation sessions are often time consuming, hard to schedule, occasionally boring, and frequently expensive for the novice who has to view classes in a cooperating school far from campus.[1]

Assumptions Behind the Technical Skills

Along with their greater validity, the Technical Skills reflect the strategy of developing "micro-criteria" of teaching effectiveness. This approach has been criticized by some as encouraging a "splintering" of teaching. However, as Gage states:

> Rather than seek criteria for the over-all effectiveness of teachers in the many, varied facets of their roles, we may have better success with criteria of effectiveness in small, specifically defined aspects of the role.[2]

The Technical Skills can be seen as examples of Gage's micro-criteria of teaching in that they are useful to teachers' specific goals and needs. A review of them is beyond the scope of the present discussion but previous descriptions of them have been made by Berliner,[3] by the Far West Laboratory for Educational Research and Development, by Allen and Ryan,[4] and by McKnight.[5]

The conception and development of the skills was also influenced by psychological research on the concepts of performance criteria and behavioral objectives for use in designing programmed instruction sequences and other instrumented processes which emphasized clear definition of task requirements.

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[1] D. C. Berliner, Microteaching and the technical skills approach to teacher training. Technical Report, Stanford Center for Research and Development in Teaching, 1969, pp. 1-2.

[2] N. L. Gage, *Handbook of research on teaching* (Chicago: Rand McNally, 1963), p. 120.

[3] Berliner (1969), op. cit.

[4] D. W. Allen and K. A. Ryan, *Microteaching* (Reading, Mass.: Addison-Wesley, 1969).

[5] P. C. McKnight, "Microteaching in teacher training: a review of research," *Research in Education*, 1971, 6, 24-38.

Modeling and the Filmed Presentation of the Skills

The use of filmed presentations of the skills reflects the assumption that learners can acquire new behaviors by observation of such behaviors, e.g. skills of teaching. (The adaptation and refinement of such skills to individual teacher's situations and goals is, of course, another matter; i.e. it requires supervisory assistance.) The following excerpt is taken from a previous paper on microteaching,[6] and reviews the theoretical assumptions to the use of model films of teaching skills.

Modeling has been described as a two-step process where the learner *first observes a model* (e.g. an expert teacher) *demonstrating a skill or skills* and then tries to shape his own behaviors after those of the model.[7] Theoretical rationale for using models comes from several sources. The work of Sheffield[8] on a contiguity theory of vicarious learning supports the idea that a trainee could

> acquire through the contiguous association of sensory events, perceptual and symbolic responses possessing cue properties that are capable of eliciting at some time after demonstrating, overt responses corresponding to these that have been modeled.[9]

A review of research on observational learning in personality development by Bandura and Walters[10] has shown that complex social behavior *may be acquired almost entirely through imitation.* Further, "the provision of face-to-face models accelerates the learning process. . . ."[11] Work by Bandura, Ross and Ross[12] showed that filmed models are as effective as real life models in transmitting behaviors.

Modeling has been seen to be important to teacher education because trainees are able to discern from deliberately planned models distinctive characteristics of teaching skills.

Constructed audiovisual demonstrations are assumed to be more effective than "live" classroom observations which are usually uncontrolled in the sense that the trainee may not observe the correct behaviors or correctly interpret what he has been told to observe. Also, as McDonald and Allen point out:

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[6] *Ibid.*

[7] W. R. Borg, et al., *The minicourse: a microteaching approach to teacher education* (Beverly Hills: Macmillan Educational Services, Inc., 1970).

[8] F. D. Sheffield, "Spread of effect without reward or learning," *Journal of Experimental Psychology*, 1949, 39, 575-579.

[9] F. J. McDonald and D. W. Allen, Training effects of feedback and modeling procedures on teacher performance. Final report of USOE Project OE-6-10-078. Stanford, California: School of Education, Stanford University, 1967. (ED 017 985) Also issued as Technical Report No. 3, Stanford Center for Research and Development in Teaching, 1967, p. 10.

[10] A. Bandura and R. H. Walters, *Social learning and personality development* (New York: Holt, Rinehart and Winston, 1963).

[11] F. J. McDonald and D. W. Allen, op. cit., p. 83.

[12] A. Bandura, D. Ross, and S. Ross, "Transmission of aggression through imitation of aggressive models," *Journal of Abnormal and Social Psychology*, 1963, 66, 3-11.

> The method of live observation does not provide for successive examinations of the teaching performance, nor for careful analysis of it. The same difficulties plus the effect of forgetting and selective remembering characterize the trainee's recollections of teaching performances he has observed during his own schooling. Obviously, descriptions of how to teach are fraught with all the problems of verbal description.[13]

Research on Modeling in Teacher Training

In teacher training, effective modeling requires that the skills which trainees observe and initiate be described in terms of specific behaviors, that competent models be used, and that trainees have practice opportunities on which they will receive immediate feedback.

After providing for these conditions, several experiments have investigated the relative effects of these conditions on teachers' acquisition of several of the technical skills of teaching. In the modeling techniques investigated, trainees view short videorecordings of master teachers performing lessons to demonstrate various teaching strategies and then practice the skill in a lesson of their own. (Techniques of model preparation have been discussed by McDonald, Allen and Siedman.)[14] They then view a videotape recording of the lesson with or without a supervisor to critique their attempt to emulate the skill previously modeled.

A model tape might be an outstanding lesson selected from the microteaching classes or a prepared tape planned and constructed according to specific criteria. Such tapes can be constructed to highlight positive and negative teaching behaviors by exaggeration or repetition and with help of role playing students.

Young[15] studied the effectiveness of self-instruction using modeling and videotape feedback to train teachers in the use of lecturing skills (use of examples, etc.) and in techniques of class management. During the first phase of the study, treatment alternatives focused trainee's attentions on the skills with the use of contingent focus (comments recorded on a second sound track of the videotape parallel to the occurrence on the model tape of the behavior to be learned) or the use of a non-contingent focus provided by a written guide. The third treatment consisted of a written explanation of the behavior (the "symbolic" model). Classroom control techniques were modeled on a 16 mm film which showed eleven problematic classroom situations, each with three alternative teacher reactions, a videotaped lesson with one alternative to each of six situations, and a symbolic model.

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[13] F. J. McDonald and D. W. Allen, op. cit., p. 3.

[14] F. J. McDonald, D. W. Allen and E. Seidman, Televised models for teacher training. Paper presented at the meeting of the American Educational Research Association, New York, February 1967.

[15] D. B. Young, The effectiveness of self-instruction in teacher education using modeling and videotape feedback. (Doctoral dissertation, Stanford University) Ann Arbor, Mich.: University Microfilms, 1967. No. 68-6518. (ED 019 883)

In the second phase of training, which took place several months later, trainees were exposed to three different modeling protocols for the lecturing skills. The "specific illustration" model simply showed a teacher giving examples of the skills in front of the camera.

The "complete" model displayed the behaviors in a lesson context with pupils, and was presented with either a contingent or non-contingent focus. Self-feedback procedures involved trainees viewing their own performance with a contingent focus (with a supervisor's critique dubbed on to the videotape) and a non-contingent focus.

Results indicated that the most effective training procedure was a combination of a "complete" model with contingent focus, a specific illustration model, and a self-viewing of performance with a contingent focus.

Koran studied the relative effects of using positive and/or negative training models of student and/or teacher behaviors. Koran assumed that by "using student or teacher behaviors alone, or negative instances of these . . . more variety in questioning behavior and responsiveness to student answers (would be produced than from) the rather narrow range of skills which might be acquired by imitation of a model."[16] None of the treatment groups produced significant results, although there was a tendency for training methods which used student models, alone or in combination with teacher models, to be more effective. Koran suggests that the student dimension is an important one in the use of videotape models.[17]

Claus continued the research on modeling procedures, assessing their effect on teachers' higher order questioning behaviors. Her independent variables were the presence or absence of cueing by a supervisor of the essential characteristics of the skill during presentation of a videotaped model or during the playback of the trainee's own videotaped microteaching performance. Results showed that cued modeling procedures were more effective than non-cued modeling, and that modeling in general was significantly more effective than feedback procedures, with or without cueing, in the acquisition of a complex teaching skill.[18]

Thus, in addition to showing the overall value of model techniques to teacher training, the studies conducted thus far have indicated that some sort of accompanying commentary (e.g., cueing and contingent focus) is a useful adjunct to the model tapes. Written commentaries are also useful but perhaps not as valuable by themselves as are the model tapes. In sum, videotape models are an efficient and effective addition to microteaching training techniques.

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[16] J. J. Koran, The relative effectiveness of imitation versus problem solving in the acquisition of a complex teaching skill. (Doctoral dissertation, Stanford University) Ann Arbor, Mich.: University Microfilms, 1968. No. 68-11314, p. 500-A.

[17] *Ibid.*

[18] K. E. Claus, Effects of modeling and feedback variables on questioning skills. Technical Report No. 6, Stanford Center for Research and Development in Teaching.

Finally, it is important to note that these skills are not *the* technical skills of teaching, but reflect a particular viewpoint as to which behaviors are useful. Other repertoires will undoubtedly be developed in coming years. Further, the Technical Skills of Teaching are being continually revised and augmented.

The General Learning Films of the Technical Skills of Teaching

Cluster I—Response Repertoire
1. Verbal Responses
2. Verbal and Non-Verbal Responses
3. Non-Verbal Responses

Cluster II—Questioning Skills
1. Divergent Questions
2. Probing Questions
3. Higher Order Questions
4. Fluency in Asking Questions

Cluster III—Increasing Student Participation
1. Recognizing Attending Behavior
2. Cueing
3. Silence and Non-Verbal Cues

Cluster IV—Creating Student Involvement
1. Stimulus Variation
2. Set Induction
3. Closure

Cluster V—Presentation Skills
1. Completeness of Communication
2. Use of Examples
3. Lecturing
4. Planned Repetition

PART V: The Improvement of Instruction Awards of the University of Kansas Endowment Association

For each of the past three years, the University of Kansas Endowment Association has made available $30,000 for the improvement of instruction. An annual competition invites faculty members to submit proposals for projects which will enhance their classroom teaching. Projects must be clearly outside the scope of their normal academic responsibilities, and must contain an evaluation mechanism by which they are to be assessed in terms of their stated objectives. A careful two stage screening process by the student-faculty Advisory Board of the Office of Instructional Resources results in the awarding of stipends to cover the costs of materials and student assistance. Progress and final reports are submitted by the project directors and the OIR disseminates information about the projects to other faculty by means of workshops. A review of the projects funded thus far follows. We will be glad to provide further information on them, as most have developed materials and procedures which can be used in a variety of other teaching situations.

Projects Funded by the "Innovation in Instruction Award" of 1972 to the Office of Instructional Resources by the Endowment Association.

Project Title: **Project to Provide Visual Aids for Kansas Plants (Botany 62)**
Directors: William Bloom and James Hamrick, Botany
Description: After traveling Kansas photographing botany specimens during various seasons, 35 mm slides were made to enrich lectures.

Project Title: **Nunemaker Intensive French**
Director: David Dinneen, Linguistics and French
Description: To test a "result-oriented" approach to language teaching by devising practical classification of skills so that students can be tested and placed when first enrolling.

Project Title: **Mathematics Laboratory Project**
Directors: James Church, Martin Hanna, Richard Hetherington, Mathematics
Description: Development of computer assisted instruction in Mathematics.

Project Title: **Improvement of Visual Aids for Geology I Laboratories**
Director: Wakefield Dort, jr., Geology
Description: To develop visual aids (slides and transparencies).

Project Title: **Using Simulation in the Classroom**
Director: Clifford Ketzel, Political Science
Description: Devising and/or updating and introducing simulations and games into introductory course in international politics.

Project Title: **Innovative Materials and Techniques in German Language**
Director: Lawrence Kitching, German
Description: To prepare linguistically oriented films, slides, and tape recordings in German to coordinate with drills and exercises.

Project Title: **Computer Assisted Instruction for Large Group Instruction in Chemistry**
Director: Alfred Lata, Chemistry
Description: To develop computer program in chemistry, suitable for large group instruction, to illustrate chemical principles utilizing mathematical techniques.

Project Title: **Proseminar for Assistant Instructors**
Director: George Peale, Spanish and Portuguese

Description: A semester-long preparation of Spanish and Portuguese assistant instructors in the areas of programming and directing drill exercises, testing, evaluating, and presentation of materials.

Project Title: **Teacher Training Program for Graduate Student Assistant Instructors in the Department of Sociology**
Director: George Ritzer, Sociology
Description: Program of a pre-semester, three day training session with emphasis on teaching skills and videotaping.

Project Title: **Preparation of Visual Aids for a Course in Russian History**
Director: Norman Saul, History
Description: To provide slides and illustrations for a Course on 19th century Russia and the 1917 revolution to complement the use of a variety of paperback books.

Project Title: **Computer-Oriented Laboratory Exercises in Biometry**
Director: Gunther Schlager, Systematics and Ecology
Description: To develop for graduate and undergraduate courses a set of computer-oriented lab exercises to teach fundamental statistics as used in the biological sciences.

Projects Funded by the "Innovation in Instruction Award" for 1973 to the Office of Instructional Resources by the Endowment Association.

Project Title: **Low Cost, Individualized Learning in the Context of a Large Lecture Course: Its Evaluation and Dissemination**
Director: Daniel Batson, Psychology
Description: To implement and test a discussion method in Psychology using undergraduate students as discussion leaders.

Project Title: **Mathematics Laboratory Project**
Directors: James Church, Martin Hanna, Richard Hetherington, Mathematics
Description: Continuation of funding from previous year.

Project Title: **Development of an Individualized Self-Pacing Module on Wait Time and Questioning Skills**
Directors: Glenn Clark and William LaShier, Education
Description: Development of an individualized learning packet which will aid science teachers in becoming more aware of the wait time between asking a question and getting an answer from the student. Teachers typically afford students too little time to respond. Awareness should also facilitate greater skills in questioning.

Project Title: **Improvement in HDFL 30: Principles in Health and Development**
Director: Marie Cross, HDFL
Description: Development of personalized individual instruction (PSI) for HDFL 30.

Project Title: **Systematic Observation Strategy and College Teaching: A Field Study**
Director: Donald Dellow, Education
Description: To field-test at the college level the strategy devised by Ober (Systematic Observation of Instruction) for its possible usefulness in providing college teachers with procedures for analyzing and improving their own teaching.

Project Title: **Development of a Measure for Assessing Teaching Competence of Graduate Assistants in Two Multi-Section Courses in Speech Communication and Human Relations**
Director: Paul Friedman, Speech and Drama
Description: To develop a means of assessing the competence of graduate student assistant instructors in Speech Communication and Human Relations in order to both screen prospective candidates as well as guide current graduate students.

Project Title: **Advancement of Instruction in Education Test and Measurement**
Directors: Douglas Glasnapp and John Poggio, Educational Psychology and Research
Description: To develop new curriculum for educational measurement course which will be designed along the ideas of mastery learning pedagogical concept.

Project Title: **Advancement in the Instruction of English**
Director: James Gowen, English
Description: To aid in training assistant instructors in freshman and sophomore English by video taping and subsequent viewing and critique sessions.

Project Title: **Computer Assisted Instruction for Large Group Instruction in Chemistry**
Director: Alfred Lata, Chemistry
Description: Continuation of funding from previous year.

Project Title: **Development and Evaluation of Exemplary Learning Packages in the Acoustics of Music**
Director: Rudolf Radocy, Music Education
Description: To identify critical aspects of the acoustics of music which are difficult for students to conceptualize and to construct

learning packages designed to facilitate learning of the problem areas.

Project Title: **Project for the Improvement in Instruction of Latin**
Director: Karl Rosen, Linguistics and Classics
Description: Computer assisted instruction in Latin.

Project Title: **Development and Evaluation of Effective Classroom Teaching Techniques**
Director: George Semb, HDFL
Description: To develop and evaluate several different teaching techniques in higher education, and provide a model for assessing teaching effectiveness on the basis of two sources: academic performance of students and student evaluation.

Project Title: **Advancement in Instruction of Art History 40**
Director: Gridley Smith, History of Art
Description: Two groups of art students will be compared in terms of achievement and appreciation. One group will confront original holdings of the Art Museum in their course. The other will rely on slides and photographs.

Project Title: **Experiments in Aerospace Engineering Education**
Director: Howard Smith, Aerospace Engineering
Description: To prepare individually prescribed instruction packages for several courses in aerospace engineering.

Project Title: **Project for Innovation in Instruction in the Department of Music Theory and Composition**
Director: Stanley Shumway, Music Theory
Description: To provide recordings of various musical problems with self correcting workbooks to encourage individualized learning in fundamentals of music theory.

Project Title: **Advancement of Instruction in Political Science**
Director: Robert Tomasek, Political Science
Description: To revamp an introductory course in international relations by focusing in depth on five or six major themes of the post-World War II period.

Project Title: **Learning for Mastery and Student Choice: Developing a Prototype for a Practical Synthesis**
Director: Donald Treffinger, Educational Psychology and Research
Description: To synthesize technology-oriented and behavioristic pedagogy and bring both approaches into learner-controlled instruction through development and implementation of a modified mastery learning model.

Project Title: **The College Dropout**
Director: Rosalie Wax, Anthropology

Description: A pilot study on determining the causes of student dissatisfaction with their classroom and other experiences at the University of Kansas.

Projects Funded by the "Innovation in Instruction Award" of 1974 to the Office of Instructional Resources by the Endowment Association.

Project Title: **Field Instructional Resources Inventory for Invertebrate Zoology Courses**
Director: Robert Beer, Systematics and Ecology
Description: To allow zoology students a unique opportunity to observe, study and intensively survey the impact of environmental changes in biota of the proposed Clinton Reservoir area and to locate the most persistent populations of fingernail clams, sponges, snails, worms, millipedes and other invertebrates. Findings will enable long term studies of animal migration, displacement, elimination and other ecological principles involved in massive environmental alteration. In addition, the invertebrate animal resources of Shawnee County will be assessed in preparation for possible expansion of off-campus educational programs in Invertebrate Zoology.

Project Title: **Coding Processes in Accounting: A Test of Computer Assisted Instruction**
Director: William Bentz, Business
Description: To test experimentally the effectiveness of a computer assisted instruction (CAI) system in the the learning of coding processes in accounting. Coding processes are a fundamental part of elementary financial accounting, with an enrollment of 750 students per year. A carefully designed evaluation of CAI progress in learning accounting may determine the extent to which this method can be more fully implemented.

Project Title: **Testing the Relative Effectiveness of Specific Techniques in Second Language Teaching**
Director: David A. Dinneen, Linguistics and French
Description: To use the Nunemaker Intensive French program as a "laboratory" for testing the relative effectiveness of particular language teaching techniques. The specific techniques will include introducing comprehension before oral response, use of dictation and presentation of grammatical descriptions before and after drill patterns.

Project Title: **Audio Visual Gaming Instructions**
Director: Marcia A. Francisco, Architecture and Urban Design

Description: To find a more effective way to introduce gaming techniques in the classroom. After making a videotape to explain and model the procedure in the urban game CLUG (Community Land Use Game developed by Allen Feldt at Cornell), the proposed study predicts this tape will increase learning by decreasing the formidable task of interpreting a 46-page rule book.

Project Title: **Individualized Audio Visual Instruction on the Use of Scientific Instrumentation in the Undergraduate Laboratory**
Directors: Gary Grunewald, Mathias Mertes and Robert Wiley, Medicinal Chemistry.
Description: To develop synchronized tape and slide self-instruction programs (to be utilized on the School's CoxCo Cassette and Slide equipment) which simulate the use of complex scientific instruments. Benefits: (1) enables students to self-pace their study and (2) increases the number of undergraduates exposed to basic knowledge about equipment before undertaking actual experimentation.

Project Title: **Infusion of a Career Education Emphasis into Teacher Education Program**
Director: John Guenther, Education
Description: To take the competencies which district teachers have identified as necessary for career education teachers and develop a series of eight instructional modules which will be integrated into teacher education at the university. Career education provides a broad approach to preparation for citizenship and helps develop attitudes about the concepts of work as well as recreation in our society.

Project Title: **Improving Undergraduate Psychology Education by Simulating the Psychological Experiment**
Director: Charles Hallenbeck, Psychology
Description: To evaluate a system of computer simulation of psychology experiments using two non-computer laboratories as a control group; and to incorporate improvements in the simulation system.

Project Title: **Proposal for Special Instructional Materials**
Director: R. M. Haralick, Electrical Engineering
Description: To supplement inadequate textbooks, the program calls for the development and implementation of 20-minute audiovisual lecture units for mathematics-engineering team-taught courses for utilization in the classroom, thus saving blackboard writing and note taking time and leaving students free to concentrate on understanding. These

units could be used out of class as self-paced review sessions. The departments of Mathematics and Engineering implemented a team-taught course to teach differential equations to engineers. The course takes an engineering perspective by having engineering problems interwoven with mathematics material.

Project Title: **Problem Solving Laboratory for Fluid Mechanics**
Directors: John D. McNown, D. E. Metzler, Ernest Pogge and Y. S. Ye, Civil Engineering.
Description: To institute an experimental learning laboratory in which students will use and test several ways of learning to solve sets of problems. The student will choose his approach and pace. The methods to be used and tested include programmed learning, audio visual aids, use of simple laboratory equipment and undergraduate tutors. The methods will be evaluated both as motivators of learning and actual learning.

Project Title: **Poisonous Plants of the Midwest—A Self Study Program**
Directors: F. Gene Martin and James D. McChesney, Medicinal Chemistry
Description: The current revival in "natural foods" and the ingestion of plant-derived drugs come at a time when medical and pharmaceutical education has moved toward synthetic medicinals. While knowledge of botanical sources of drugs is no longer required of pharmacists, the occasion still arises when such knowledge is of life-saving importance. To develop a self-taught, audio visual unit emphasizing identification of various poisonous plants in different seasons, effects of exposure and therapeutic approaches is the goal of this project.

Project Title: **Improvement of Russian Language Instruction**
Director: Gerald Mikkelson, Slavic Languages and Literature
Description: To improve Russian language instruction by more closely coordinating all Russian courses given in two semesters —establishing syllabi, collecting teaching materials, setting rotational teaching schedules, and by overseeing the practical training of graduate teaching assistants (implemented by a system of mutual classroom visits and periodic teacher rotation over the various levels of Russian language instruction).

Project Title: **Improvement of Instruction in Biochemistry 259: Completion of Updating and Reorganization**
Director: Marjorie Newmark, Biochemistry

Description: To correlate the hands-on, investigative approach with a new laboratory in biochemistry, the proposal will complete and update experiments to ensure workability and prepare written instructions of new experiments.

Project Title: **An Instructional Module in Critical Thinking**
Director: Ruth Noyce, Education
Description: To develop and test an instructional module in critical thinking. The module would provide teachers-in-training with an understanding of the higher cognitive skills students should be encouraged to develop with activities which promote these skills. Direct instruction will focus on the thinking abilities of extrapolation, application, analysis, synthesis and evaluation.

Project Title: **Follow-up Evaluation of Mastery Learning Outcomes and Implementation of Field-oriented Competencies in Educational Tests and Measurements**
Directors: John Poggio and Douglas Glasnapp, Educational Psychology and Research
Description: To introduce real and simulated field-oriented experiences which allow students to transfer measurement skills to the classroom, to expand the instructional information units which provide greater opportunity for self-paced study, and to conduct two year longitudinal follow-up evaluation of students' retention and use of skills.

Project Title: **Improvement of Instruction by the Keller Plan**
Director: Richard Sapp, Physics and Astronomy
Description: Utilization of a modified form of the Keller Plan of self-paced, mastery learning in Physics 2 to test the Keller Plan hypothesis that undergraduate students are more effective as tutors than graduate students or faculty.

Project Title: **Digital Logic Laboratory Development**
Director: Earl Schweppe, Computer Science
Description: To develop and implement laboratory equipment and exercises which enhance student understanding of the nature of computer construction. Anticipating future fully-equipped digital logic laboratories, the enduring product of this effort will be experience gained concerning longer term needs.

Project Title: **An Attempt to Preserve Works of Great Photojournalists for College Students**
Director: William Seymour, Journalism
Description: A first step toward making the university a repository for the works of famous photographers. The proposed

program would bring outstanding photographers to campus for a week's stay, video tape these visits for possible airing on educational TV, construct a slide show of each photographer's works with taped comments, and prepare a monograph of each photographer's best productions for student use.

Project Title: **Development of a "Learning Ideas Workshops"**
Director: Flora Wyatt, Education
Description: To coordinate and supply materials and ideas for a learning ideas workshop. Learning materials invented or devised by elementary teachers and majors will be constructed by local, volunteer retired persons. The project would incidentally offer an opportunity to encourage youth's appreciation for older citizens.

Projects Funded by the "Innovation in Instruction Award" of 1975 to the Office of Instructional Resources by the Endowment Association.

Project Title: **A Handbook Describing and Illustrating the Techniques of Successful Fieldwork**
Directors: Marion Bickford, Geology and Walter Smith, Education
Description: To develop, write, and distribute a handbook delineating and discussing the skills utilized in fieldwork in many disciplines; topics covered include map reading, basic geologic and geographic knowledge, essential equipment, legal and community responsibilities, photography, collecting, etc.

Project Title: **Filmed Incidents: Aid in the Preparation of Educational Planners**
Director: George Crawford, AFHE
Description: Development of six filmed incidents which simulate a range of problems which confront school superintendents, principals, and teachers; the project aims at developing greater awareness of the problems and nature of educational planning as well as its positive potential.

Project Title: **Preparation of Sets of Projection Transparencies for Teaching of the Cellular Events During the Inflammatory Reaction**
Director: Laurence Draper, Microbiology
Description: title is self-explanatory.

Project Title: **Development and Evaluation of Videotape Scenarios for Use in a Class on Classroom Management**
Director: Marvin Fine, Educational Psychology and Research

Description: To map out scenarios depicting approximately 30 skills identified in effective classroom management; videotape the scenarios as acted by teachers and students; utilize the tapes in the classroom for observation, discussion and evaluation.

Project Title: **Development of an Oral History Project**
Director: L. George Griffin, Kansas Collection, Spencer Library
Description: Griffin, in conjunction with colleagues in the department of History, wishes to encourage, support, and instruct students in the technical skills of interviewing, transcribing and editing local history interviews. The project will increase the primary source materials in the Kansas Collection thus allowing future history classes to make oral history an integral part of the course work.

Project Title: **Development, Coordination, and Dissemination of Learning Packages in the Social Studies**
Director: John Guenther, Education
Description: To provide instruction to in-service and pre-service teachers in the development of learning packages and organize a system to share packages and disseminate them throughout the state.

Project Title: **Development of Study Guides of Biological Concepts, Natural History, Environmental Education, and Activities at the Museum of Natural History**
Director: Philip Humphrey, Museum Director
Description: To prepare and distribute booklets offering practical advice (to pre-service and in-service teachers) on how to conduct museum visits and suggesting ideas for pre- and post-visit learning activities.

Project Title: **Improvement in Teaching in Biology**
Director: R. W. Lichtwardt, Botany
Description: Preparation of slide collections for a course called "Nature of Organisms" depicting plants and animals photographed in natural situations, in the lab, or copied from textbook illustrations.

Project Title: **Development of a Series of Technical and Procedural Videotapes Essential to the Execution and Expertness of the Contemporary Metalsmith**
Director: Gary Nemchock, Design
Description: To develop a support system of videotapes which demonstrate certain important processes and technical applications in metalsmithing so that students can refer to these basic skills whenever they need them.

Project Title: **Modular Media Center**
Director: Gary Nemchock, Design
Description: Construction of a demountable, portable, moveable media center for use in student viewing of videotapes.

Project Title: **Improving Teaching in Microbiology**
Director: David Paretsky, Microbiology
Description: To purchase a slide-sound projector to show complex laboratory procedures (demonstrated and discussed on film) to students in large classes (in which labs are physically impossible) and during labs as preparation for using expensive equipment.

Project Title: **Improvement of Student Teaching in Direct Oral Latin**
Directors: Dennis Quinn, English and John Senior, Classics
Description: Development of a teacher's manual and model videotape to use in training apprentice teachers who assist in the teaching of 32 praeposter sections of Latin in the Pearson Integrated Humanities Program.

Project Title: **Development of Micro-Packet Materials for Use in the Music Therapy Curriculum**
Director: Sue Russell, Music Education
Description: Development of learning packets containing printed materials, cassettes and videotapes for individualized instruction for music therapy students. The project will emphasize, with its videotaping, various behaviors of children involved in music therapy so that pre-service teachers or therapists can recognize and treat such behaviors.

Project Title: **The Scalatron: A New Opportunity for Preparation of Learning Materials in Psychoacoustics**
Director: Rudolf Radocy, Music Education
Description: Project received support for rental of a scalatron, a recently developed electronic organ which permits minute adjustments in the frequencies produced by individual keys. The instrument will be used to examine psychoacoustical phenomena.

Project Title: **Development of a Videotape Library of Children's Behavior**
Director: Neil Salkind, Educational Psychology and Research
Description: Development of a library of 50 half-hour tapes illustrating a variety of meaningful children's behavior in different settings. The library would serve as an aid in areas of education, human development, psychology, anthropology, and sociology providing examples of human behavior as well as offering an opportunity to teach observational skills.

Project Title: **Developing a Fabric and Slide Collection for Teaching Purposes**
Director: Elsa Sreenivasam, Design
Description: Development and documentation of a resources collection (slide and actual fabrics) depicting surface-patterned textiles, past and present, from various cultures and from various artists. The collection is to be used in Textile Design classes as illustrative material and informative exhibits.

Project Title: **Improving Teaching in Biology**
Director: Karl A. Stockhammer, Biology
Description: To purchase films and develop photocopied materials and overhead transparencies for several courses in biology and Physiology.

Project Title: **Sequential Decision-Making Computerized Testing Model**
Director: Nona Tollefson, Educational Psychology and Research
Description: Development of a computerized testing program which implements self-paced instruction as well as self-paced testing.

Project Title: **Improvement in Teaching Intensive Elementary Chinese**
Directors: Grace Wan and Joseph Kuo, Oriental Languages and Literature
Description: To copy and mimeograph 30 lessons in elementary Chinese which introduce the first 450 characters to be mastered by beginning students.

Project Title: **Programmed Analysis of Tennis Skills with the Aid of High Speed Cinematography**
Director: Carol Zebas, HPER
Description: To produce films which will lead to a programmed analysis of common errors in tennis skills execution. The films will be shown in classes so that each skill can be viewed systematically. Physical education majors can use the films to more objectively observe common errors so that future teaching can be improved.

Experimental Project:

Project Title: **Visual Aids in Innovative Humanities Instruction**
Director: Production of extensive slide collections for all courses in the humanities based on photographs of resources housed in Spencer Research Library. Due to the importance and potential of the project (3M might mass produce and distribute the slides after initial development),

it was funded at a higher rate than most projects which OIR handles. The project will be closely evaluated to determine whether a concentration of funds on a few major projects is more effective than funding numerous smaller projects.

PART VI: Annotated Bibliography

The following annotations should indicate the kinds of issues involved in various aspects of teaching at the post secondary level. The summaries are also representative of the sources available in the Office of Instructional Resources for review and use by faculty members. The section on the evaluation of classroom teaching is emphasized because of current concern with the procedures and instruments for faculty evaluation. Sources reviewed here will be used in a forthcoming report on classroom evaluation by the Office of Instructional Resources. Preceding the reviews is a brief topical index indicating the four focal areas for this edition.

Several of the books reviewed are available for faculty members to check out. Along with others, including some from the collection of Professor Richard Schusler, they constitute a small library of books about student-teacher interaction, teaching improvement, and teacher evaluation. A more extensive list of books (not annotated) may be found in "On the Improvement of Instruction in Higher Education: A Bibliography" by McKnight and Paskal which is available in the Office of Instructional Resources.

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2. Bloom, *Handbook on Formative and Summative Evaluation of Student Learning*
3. Broudy, *Philosophy of Education: An Organization of Topics and Selected Sources*
4. Cartwright, *Group Dynamics Research and Theory*
5. Cronbach, *Educational Psychology*
6. Ebel, *Encyclopedia of Educational Research*
7. Gage, *Handbook of Research on Teaching,* 1972
8. Krathwohl, *Taxonomy of Educational Objectives: The Classification of Educational Goals—Handbook II, Affective Domain*
9. Travers, *Handbook of Research on Teaching,* 1975

Focus on the Teacher: Behaviors, Effective Characteristics

Aspy, David N. and Flora Roebuck. **"An Investigation of the Relationship between Student Levels of Cognitive Functioning and the Teacher's Classroom Behavior,"** The Journal of Educational Research, 1972, 65, 365-368.

This study examined the relationship between teacher humanness and student academic achievement. Using audio recordings of 40 elementary reading groups, the researchers analyzed the teachers' performance by three procedures: 1) Carkhuff's scales for empathy, congruence, and positive regard, 2) Flander's interaction analysis, and 3) assessment of student cognitive level based on Bloom's taxonomy. One-half of the teachers taught at level one of the taxonomy while the other classes achieved levels of two to six. The major behavior variable differentiating the teachers was level of positive regard toward students. The study indicates ". . . a teacher's increased positive regard for students is translated into classroom behavior which elicits higher levels of cognitive functioning from the students." Though conducted at a different academic level, its findings may be generalizable to all pedagogical situations.

Chambers, Jack. **"College Teachers: Their Effect on Creativity of Students,"** Journal of Educational Psychology, 1973, 65, 326-334.

Doctoral graduates (since 1955) in psychology and chemistry, whose research was judged creative by members of the National Academy of Sciences and other eminent scientists, were asked to evaluate their mentors on the basis of facilitating or inhibiting creativity. The graduates answered a 47 point multiple choice test pertaining to behaviors of their teachers in and out of the classroom, classroom atmosphere, teaching methods, and general student-teacher relationships. Each student had the option of adding three specific items particular to his experience. From the data gained, the investigator identified and discussed "clear-cut behavorial patterns" which differentiated the teachers into facilitators and inhibitors of creativity. Facilitators conducted informal classes; used exams as learning aids; were intellectually demanding; were available to students; were interested in their fields, their students, and the learning process; were tolerant of intellectual challenges; and rewarded creativity in their students' work and modeled it in their own. Inhibitors were insecure, hypercritical, unenthusiastic, had narrow interests, and were not available to students. Encouragement by the teacher outside the classroom was found to be the most important aspect affecting creativity. In addition, the most highly creative scientists were found to have been most influenced by teachers who were more interested in research than in teaching.

Finn, Stanley R. (Ed.) "Characteristics of the Effective College Teacher," Higher Education Research Abstracts No. 8, September 1969. Center for the Study of Higher Education, Hofstra University.

Hofstra Abstract #8 gives brief summaries of eleven empirical studies examining characteristics students perceive as effective or ideal in college teachers. Procedurely, most studies gathered descriptive traits from small groups, and then tested these traits among a larger population asking student respondents to rank traits on a continuum of effective to ineffective. The studies suggest that the effective teacher is one who 1) is interested in his students, 2) encourages independent thinking, 3) demonstrates enthusiasm for subject matter, 4) knows material related to the class, 5) returns papers promptly, and 6) is involved in research activities (especially important to graduate student raters).

A number of the studies attend to the variables which determine students' perceptions of desirable teacher traits. These studies suggest the influence of students' personalities, majors, ethnic backgrounds, and their attitude toward education in general.

The studies vary in their complexity and information on instrumentation reliability is inadequate.

Mann, Richard D., et al. **The College Classroom: Conflict, Change and Learning.** New York: John Wiley and Sons, 1970.

Mann and his associates, all connected with the University of Michigan Psychology Department, have depicted the college classroom as a dynamic and complex social organization. Focusing on four professors and their students in day-to-day class meetings, the authors gathered data through a variety of methods—repeated direct observation, continuous recordings, periodic interviews, spaced questionnaires, and final questionnaires. The authors establish that what goes on in the classroom for both teacher and students is "work," and education is the "process of learning to work." As the leader of the work group, the professor is expected to act in many roles, for which the authors establish role models. The students are capable of making diverse adaptations to each classroom. The authors bring both forces together in a case study of teacher strategies and student responses describing what they see as an effective teaching culture. The book is extremely worthwhile. For the educational researcher, appendices A and B contain the authors' informative methodological footnotes and exemplify their rating instruments.

Ornstein, Allen C. **"Systematizing Teacher Behavior Research,"** Phi Delta Kappan, 1971, 52 (9), 551-554.

Ornstein's purpose in this terse four page article is to systematize the "voluminous" and seemingly "contradictory" research on teacher behavior. He categorizes recent research into three distinct approaches: model systems (the most sophisticated embrace the entire teaching/learning environment); instructional processes (viewing teaching as continuous

interaction); and teacher behavior characteristics (the least sophisticated approach). On the basis of these categories, Ornstein briefly summarizes and critiques dozens of research studies. The article is valuable for its two page bibliography as well as its content.

Yuker, H. E. "The Components of Effective Teaching as Viewed by Effective Teachers," Center for the Study of Higher Education, Hofstra University, #80, May, 1969.

Various means of identifying and describing components of effective teaching are discussed. Using the "Perry approach" of establishing a ranked list of sixty effective behaviors, forty items were selected and given to nine "teachers of the year" at Hofstra (selected in 1960 through 1968) for rating on a five point scale . Items rated most highly were those relating to faculty-student interrelationships: knowing the student, establishing rapport, respecting and motivating the student, and being available. The next group of behaviors most highly rated referred to specific techniques: being well prepared for class, encouraging class participation, and returning graded material promptly. Significantly, almost all of these qualities relate to behavior that can be modified by the individual.

Yuker, H. E. **"Time Spent in Committee Meetings,"** Center for the Study of Higher Education, Hofstra University, Report # 103, September, 1972

A study done at Hofstra University, based on questionnaires returned by 98 percent of the staff (123 persons), found that about 1,318 man hours were spent per month in committee meetings. This represents, at a cost of $15.00 per hour, $20,000 per month, or a total cost of $100,000 (for meetings taking place from August to December, 1971). During the period of February to March, 1972, a more specific study was done of the Advisory Council. Its members were found to spend about 25 percent of their academic work time in meetings. The conclusion was drawn that committee meetings are a pervasive characteristic of teaching in higher education, and are a costly activity. It may be desirable, states Yuker, to reduce the number and size of committees and the length of meetings. Making an effective choice of committee chairman might ensure the latter.

The question here discussed assumes that nothing in the way of teaching, learning, or research goes on in the committee meetings. Information about the purpose and content of the meetings would be useful, as well as a discussion of how faculty involvement relates to the university power structure. It may be that the cost of exercising (or maintaining) group power is the investment of time.

Focus on Teaching Methods

Bloom, B. S. **"Thought Processes in Lectures and Discussion,"** Journal of General Education, 1953, 7, 160-169.

Bloom utilized "stimulated recall" to determine student thought processes among members of both large lecture and small discussion sessions. He found anxiety-producing thoughts concerning self-image in a discussion situation are significantly more frequent than in the large lecture; 22% of student thoughts in lectures can be classified as comprehension-oriented as compared with 9% in discussion; and 8% of thought in discussion situations is devoted to high order thinking (problem-solving) as opposed to only 1% during lectures. Bloom concluded that if the objective of education is development and comprehension of knowledge, lecture is more efficient. If the objective is development of problem solving skills, the "least efficient discussion is superior to most lectures." Of course, both objectives are important. The task is to provide appropriate contexts and occasions for them. Further, it is important to reduce student anxiety in discussions.

Feldhusen, John. **"The Effects of Small and Large Group Instruction on Learning of Subject Matter Attitudes and Interests,"** The Journal of Psychology, 1963, 55, 357-362.

Evaluation of five educational psychology classes showed that students in large and small classes mastered the subject matter about equally well. There was also no difference in "terminal measures" of interest in teaching, evaluation of the course, or of the teacher. However, students in small classes had decidedly better attitudes towards the class which could be related to better student-teacher rapport. Overall, the study showed students to be a "neutral bunch," yet 40% of those in large classes would have preferred small classes.

Fisher, Judith and Mary Harris. **"Effect of Note Taking and Review on Recall,"** Journal of Educational Psychology, 1973, 65, 321-325.

Students at the University of New Mexico in Human Development were divided into five different groups with varying combinations of note taking and review. One group took no notes themselves, but reviewed the lecturer's notes; another group took no notes and reviewed the lecture from memory; the third group took notes, but utilized only a mental review; the fourth took notes and reviewed their own notes; and the fifth group took notes, but reviewed the lecturer's notes. Results showed that group taking notes and reviewing their notes produced most recall, endorsing the opinion that notes do serve as an "external memory device" as well as a personalized "encoding process" for the student. The least recall of data was produced by the group which did not take notes and reviewed the lecture only mentally. It was also found that quality of notes was positively correlated with free-recall score for two of the three note-taking groups.

Greene, Edward Barrows. **"The Relative Effectiveness of Lecture and Individual Reading as Methods of College Teaching,"** Genetic Psychology Monographs, (December, 1928), 459-502.

The monograph is included for its historical interest. It was written in 1928 when Harvard, Antioch, and other schools were initiating special seminars and independent study for juniors and seniors. Greene attempted to construct a research method whereby this innovative teaching/learning method could be compared with the lecture method. Students in elementary psychology in two large city schools were divided into two classes. One was given information by lecture; the other read identical material in printed form. Students followed their usual habits of note taking. Immediate and delayed completion and T-F tests followed the classroom procedures. Greene did the lecturing, the gathering of reading material, and also constructed the exams which may have introduced bias into his project. He collected and analyzed contrasting data gained through test results, student confidence ratings and tests of student expectations. Greene concluded that there was no justification for hypothesizing that one method was more beneficial than the other until more fully controlled experiments could be made which would consider the variable of out-of-class reviewing by students.

Haines, Donald Bruce, and W. J. McKeachie. **"Cooperative Versus Competitive Discussion Methods in Teaching Introductory Psychology,"** Journal of Educational Psychology, 1967, 58, 386-390.

Cooperative and competitive teaching and grading techniques were utilized in four discussion sections in introductory psychology at the University of Michigan. Both kinds of techniques were measured for their effect on student tension level, achievement, and satisfaction. The study demonstrated that students in a competitive discussion situation become more anxious, less confident, were less able to perform effectively and came to dislike discussions. When discussion was structured cooperatively (i.e., the entire class was credited when one person answered a question correctly), students became less tense, displayed more task-oriented behavior, worked more effectively, and enjoyed the discussion.

Maier, Norman and Allen Solem. **"The Contribution of a Discussion Leader to the Quality of Group Thinking: The Effective Use of Minority Opinions,"** Human Relations, 1952, 5, 277-288.

The quality of group thinking of 34 groups (composed of 5 or 6 students) with a designated discussion leader was contrasted with 33 groups supplied with an observer. Both groups were given a simple problem to solve. Individuals recorded their initial answer and were then allowed 8 minutes to discuss. They recorded their answers again, perhaps changing them in light of the discussion. The groups having a designated discussion leader concluded the exercise with correct final responses 83.6% of the time contrasted with 71.6% in groups with only an observer. The results of the study indicate that a discussion leader can up-grade a group's thinking by protecting minority opinion. In a leaderless discussion the majority opinion seems to dominate whether it is right or wrong.

Melnick, Murray. **"Independent Study—A Review of the Research Literature,"** Center for the Study of Higher Education, Hofstra University, Report #84, September, 1969.

Research studies published up to 1969 do not consistently favor "Independent Study" over other methodologies. Methodological problems may explain lack of agreement, but substantive issues are also involved. Independent study may be most effective only under certain circumstances and for certain students' needs. Students who prefer more direction in their courses may find independent study difficult. Independent study may also be inappropriate in classes where cooperation and/or joint action are important. Some investigators, finding no significant advantage of independent study over other methodologies, sought to show increases in such behaviors as interest in the class, but even these achievements are not supported consistently by all studies. Reservations on favorable generalizations about independent study seemed warranted. Valid comparison of various studies is difficult because of conceptual and methodological diversity. For example, the term "independent study" has been used to describe both permissive and highly structured arrangements with instructors, on and off campus.

The article gives a succinct perspective of the concept and related research, and offers useful references.

Reed, Rodney. **"When Students Teach: Tutoring by Peers,"** *The Research Reporter* (Center for Research and Development in Higher Education, University of California at Berkeley), 1973, 8, (1).

The study summarizes data obtained through questionnaires from 59 institutions and visitations to 20 campuses which have implemented student tutorial programs. The article discusses goals of tutorial programs, financing and structuring of programs, tutor selection and training processes, ethnic matching of tutor and student, and tutoring patterns. A preliminary evaluation concludes peer tutoring provides a greatly needed service; peer tutors are more effective than either paraprofessional adults or faculty; benefits accruing to the student are equaled by benefits accruing to the tutor (i.e., self esteem, communication skills, understanding of subject); and peer tutoring as a formal program needs to be continued and expanded.

Seltzer, Robert. **"Computer-Assisted Instruction—What It Can and Cannot do,"** American Psychologist, 1971, 20, 373-377.

Seltzer describes ways in which computers can be and are currently used in education: drill and practice, tutorial, dialogue, simulation and gaming, retrieval and reorganization of information, problem solving, and artistic design. Seltzer applies three criteria to judge the value of each of these modes: 1) if the computer poses a unique solution to an important problem in the instructional process, use it; 2) if the computer is more effective or efficient than another mode of teaching, and cost is minimal, use it; 3) if the cost is high and the computer's effectiveness is marginal, do not use it. On the basis of these criteria, Seltzer believes that use of the computer for the tutorial, in simulation and gaming, for information storage and retrieval, and for problem solving is acceptable. As an interesting side note, Seltzer states that if a computer *can* replace a teacher, it *ought* to. The computer, according to Seltzer, is merely a tool which can absorb the repetitive or drudgery aspects of teaching leaving an instructor free to stimulate critical and creating thinking.

Semb, George. **"Behavior Modification and Higher Education,"** a paper read at the Iowa Conference on Behavior Modification, October 27, 1972.

Professor Semb, associate professor at the University of Kansas, describes at length the personalized system of instruction (PSI) used at KU in its Department of Human Development and Family Life. He outlines how KU has modified and implemented specific features of the Keller method of PSI, including well specified study objectives, self pacing, mastery of small units, use of lecture only as motivation vehicles, quizzes, and use of undergraduate proctors or tutors. A helpful one page bibliography is included.

Focus on the Evaluation of Teaching

————, **Attitudes of Senior Students from a Small Liberal Arts College Concerning Faculty and Course Evaluation,"** Research Report, Office of Institutional Research and Evaluation at Centre College of Kentucky, Danville, Kentucky, October, 1973.

This study focused on the attitudes of students toward faculty evaluation. The Senior class at Centre College, divided by discipline and sex, answered a 37 item questionnaire concerning 1) students' right and ability to evaluate teachers; 2) student's objectivity in evaluating; 3) procedures used in conducting course evaluation; and 4) the use to be made of the information gained from student responses. Using a simple distribution frequency, the study reported that 95% felt they had the right to evaluate; and 61% felt they knew enough about teaching to evaluate.

Students believed they were fair and objective as evaluators. There was ambivalence over correct procedures, and "generally" the students did not want the results of evaluation to be used for personnel decisions. Forty-six percent felt evaluation had improved the quality of instruction; 41% said it had not. On the basis of the study, the investigators believe student attitudes should be studied, for it is possible students will respond differently when they are having input concerning a professor's academic career than when they are informing him of their perceptions of his strengths and weaknesses.

The problem discussed in the study is a real one, but the strategy used to investigate it was essentially one of poll-taking, and summarizing by way of frequency distribution. More sophisticated studies should be done and replicated.

Barr, A. S., et al. **"Report of the Committee on the Criteria of Teacher Effectiveness,"** Review of Educational Research, 1952, 22, 238-262.

The American Educational Research Association (AERA) appointed this committee in 1950. The lengthy report is a product of a three day meeting at the University of Illinois in 1951. The results followed from two assumptions: the committee should deal with teacher effectiveness rather than teaching effectiveness; and should be concerned with conceptual formation of problems of research in this area rather than establishing operational definitions. Consequently, the report is very general. For example, it establishes general teacher behaviors in three categories (behaviors affecting pupil, school, and community) without specifically identifying those behaviors. The committee basically outlined what should be done in research concerning teacher effectiveness rather than how to do it, for which it is criticized by one of its own members in a brief minority report filed with this article. The report is included for its historical significance and interest.

Centra, John A. **"Do Student Ratings of Teachers Improve Instruction?"** Change, 1973, 5 (3), 12-13.

Centra worked with five hundred classes and nearly four hundred professors in five colleges and universities representing a variety of teaching environments. The professors were randomly assigned to one of three groups: a Feedback group which received student ratings and diagnosis at mid-semester; a no-Feedback group which received student ratings only; and a post-test group which received student ratings but only at semester's end. Student ratings included twenty-three items concerning course organization, teaching pace, teacher availability, clarity of objectives, etc. Teachers in all groups also rated themselves on the student instrument at mid-semester.

It was found that individual teachers in the feedback group whose self-evaluation was in significant disagreement with student views changed teaching practices in a positive way. The second semester, these teachers improved on several items on the student evaluation. One of the study's conclusions was given enough time, student ratings did result in positive instructional changes. A second conclusion was feedback groups were aided by receiving comparative information from ratings of other professors which helped them interpret their own scores. A seventy page monograph which more fully delineates the project from which this article is drawn is entitled The Utility of Student Ratings for Instructional Improvement. In this longer work, Centra draws additional conclusions from his data concerning differences among schools, departments, instructors' teaching experience and sex; and also discusses in greater detail the impact of professors' self-evaluation. Centra's work is persuasive because of the size of his sample drawn from a variety of schools, and the two semester time span of the study.

Coats, William D. and Lloyd Swierenga. **"Student Perceptions of Teachers—A Factor Analytic Study,"** The Journal of Educational Research, 1972, 65, 357-360.

Through use of factor analysis of responses by 42,810 Midwest junior-high and high school students to the Teacher Image Questionnaire, the researchers attempted to determine the number and nature of factors accounting for student perceptions of teacher effectiveness. They found that the single most important factor, accounting for 61.5% of variance in test items, is a kind of "teacher charisma" or popularity. The study concluded . . . "students do not respond directly to specific questions regarding teacher effectiveness." Instead, a "halo effect" based on the teacher's popularity is more predictive of how a student reacts to questions.

Coffman, William. **"Determining Students' Concepts of Effective Teaching from their Ratings of Instructors,"** Journal of Educational Psychology, 1954, 45, 277-286.

Coffman analyzed the ratings of 55 instructors who had been evaluated by their students on the Oklahoma A and M "Rating Scale for Instructors." Using factor analyses and intercorrelations, effective teaching was found to be most highly correlated with teacher empathy, course organization, and teacher verbal fluency. "Thinking demanded of the student" was a factor showing low correlation with effective teaching. If evaluation tools such as the one analyzed seem to restrict the "ideal" teacher, Coffman prefers to believe it is because of the limitations of the rating scale (which therefore needs to be revised), or because of failure to more fully examine each instructor's classroom objectives.

Costin, Frank, William Greenough, and R. J. Menges. **"Student Ratings of College Teaching: Reliability, Validity, Usefulness,"** Review of Educational Research, 1971, 41, 511-535.

The article succinctly summarizes research done over the last three decades on student evaluation of teaching. Costin, et al., have organized pertinent research under the three broad headings indicated in the title, but within those divisions have grouped studies around specific subtopics. From their search of the literature, they conclude that student ratings can provide reliable and valid information on quality of courses and instruction and that overall effectiveness of teaching seems to be positively related to a teacher's "imaginative intelligence, emotional stability, agreeableness, and enthusiasm." On the other hand, the investigators remind readers that undergraduate ratings fall short of a complete assessment of an instructor's teaching contribution because they do not measure faculty participation on thesis committees, individual instruction sessions, developing new courses, etc. Nevertheless, if teaching performance is to be evaluated, the authors state ". . . a systematic measure of student attitudes, opinions, and observations can hardly be ignored." The bibliography with the article is excellent, and some of the articles cited are contained within this Handbook's bibliography.

Detchen, Lily. **"Shall the Student Rate the Professor?"** Journal of Higher Education, 1940, 11, 146-154.

Detchen's is a general article which briefly presents the traditional defenses of student ratings (students do have opinions which they can sincerely report, they are the consumers of teachers' activities, etc.), the traditional criticism of student ratings (the difficulty with measuring validity and reliability), and the dangers of ratings (faculty fears of ratings used as clubs in administrators' hands). Detchen cites only one empirical study to refute criticism and bases her generally positive remarks on her experience with evaluation at the College of Education at the University of Louisville, Kentucky. She offers suggestions to improve evaluation instruments: flexibility in the discrimination scale; elimination from the evaluation process of vague personality traits; greater attention to variability and distribution frequencies rather than "averages;" and weighting of student opinion based on the degree of student intellect (i.e., "superior" students' viewpoints should be weighed more than others). Her bibliography of 23 references dating from the 1920's and 1930's may be used for historical research on the subject. Her opinions and suggestions provide an interesting background to recent developments.

Doyle, Walter, and Judith M. Redwine. **"Effect of Intent–Action Discrepancy and Student Performance Feedback on Teacher Behavior Change,"** Journal of Educational Psychology, 1974, 66, 750-755.

The study was designed to examine the effects of verbal feedback on the perceptions and behavior of experienced teachers. Most studies have found a teacher will act to reduce the discrepancy between what he intended to do in the classroom and what he actually did, after receiving feedback. This experiment was conducted in a microteaching laboratory setting in which 36 experienced junior high school teachers taught the same content to two groups, before and after feedback. Behavior of the teacher during the ten minute teaching sessions was analyzed and coded using interaction analysis technique. Feedback between sessions consisted of information about 1) discrepancy between stated intent of the teacher (i.e., how he planned to teach) and observed behavior, and 2) student learning outcomes. During the feedback treatments, no prompts were given concerning desired behavior or training dimension. The study revealed that feedback treatments were associated with significant modifications in teacher intent, but had no significant effects for teacher behavior. The study thus suggests two things: personal intentions of teachers do not serve as performance models with sufficient power to change actual behavior; and modification of teacher behavior is dependent on activities other than verbal feedback.

Eble, Kenneth. **The Recognition and Evaluation of Teaching,** American Association of University Professors—The Project to Improve College Teaching.

The monograph presents information concerning evaluation of effective university teaching gathered by the American Association of University Professors (AAUP) since 1969. The information was derived from a literature search, solicitation of information from universities, visits to campuses, and a Conference on Evaluation held in 1970. Chapters discuss recognition of teaching, evaluation and improvement of teaching, student evaluation instruments, impact of student evaluation, and student evaluation and faculty review. An appendix contains a report on a pilot study of evaluation at Princeton, a student survey from the University of Washington, faculty opinion on a peer visitation program at Carnegie-Mellon, and an excellent six page bibliography on evaluation of teaching.

Eckert, Ruth. **"Ways of Evaluating College Teaching,"** School and Society, 1950, 71 (1833), 65-69.

Professor Eckert suggests types of evidence that a faculty can use to judge, and attempt to improve, its teaching performance. To determine how a particular individual stimulates and guides the learning process, course materials which a professor has developed can be studied. His participation in college committee work on teaching can be observed. Materials he has published on teaching problems in his field can be assessed. Professor Eckert warns that these approaches to evaluation presuppose utilization by competent persons with all steps in the evaluation process carefully defined. In order to study and promote the learning processes in the classroom, Eckert suggests use of ratings by fellow instructors (based on regular and systematic class visitations) and by students themselves. Such ratings need to be supplemented, according to Eckert, with evaluation methods which show the long-range significance of a given learning experience such as 1) comparisons of standing secured on departmental examinations by students in various sections, 2) comparison of students' performance on pre- and post tests, and 3) investigation of subsequent activities of students after they have taken a given course or sequence of courses.

Finkbeiner, Carl T., et al. **"Course and Instructor Evaluation: Some Dimensions of a Questionnaire,"** Journal of Educational Psychology, 1963, 64, 159-163.

This study was undertaken to determine the underlying factors of an instructor and course evaluation instrument used at Cleveland State University, and to provide a means for revising the content of the instrument. After administering a questionnaire to over 8,000 students, the data were factor analyzed, yielding five factors which accounted for 50% of the total variance. The five factors were General Course Attitude, Attitude toward Exams, Attitude toward Method, Instructor/Student Rapport and Attitude toward Work Load. The article encouraged use of a multi-factor evaluation instrument.

Frey, Peter, **"The On-Going Debate: Student Evaluation of Teaching,"** Change, 1974, 6 (1), 47-48, 64.

Frey's research on student evaluation of teaching has shown that students are reliable and consistent evaluators. Groups of students can and do agree in discriminating among strengths and weaknesses of different teachers. The question of validity of student ratings, in the sense of determining which instructors are overall the "best" teachers, is a harder issue with which to deal. It is with the issue of validity that Frey is concerned.

Frey believes it necessary to view the teaching situation as having many dimensions which can be rated separately. These teaching dimensions are all observable, specific behaviors. On these separate and specific behaviors students can offer information uncontaminated by a personal value system, if asked appropriately constructed questions. To Frey, it is essential to maintain a distinction between students as evaluators (evaluating overall teaching styles) and as information sources (giving information about how well a teacher exhibits certain behaviors). The key, to Frey, in evaluation is the development of a technically sound measuring instrument asking for specific information. Such an instrument can give valid information.

Utilizing his own method of trying to find positive correlations between specific teaching dimensions and student achievement on final exams, Frey found six independent dimensions of teaching: presentation clarity; work load; personal attention; class discussion; organization-planning; and, grading. In various settings, different traits have stronger or weaker correlations with student accomplishment. In conducting research with a group of calculus instructors and students using a common textbook and exams, student ratings of teachers were most highly correlated with student achievement, presentation clarity and organization-planning. The "personal attention" trait of the teacher was only a weak component when students were asked to make overall evaluations of the teacher. Of course, in this kind of course presentation, this dimension may not have been seen by students as important. Frey makes some criticisms of the Rodin study which used the "overall" teaching description with calculus TA's who he sees as reviewers, not the teachers, of the subject. (see Rodin, this section)

A sound, objective rating system which seeks information about specific behaviors, Frey believes, provides useful information for all levels of the university. It could improve faculty performance. It could aid chairpersons in assigning professors on the basis of their strengths. It could provide data concerning which teaching styles are most effective in different settings.

Gessner, Peter K. **"Evaluation of Instruction,"** *Science*, 1973, 180, 566-569.

This study involved 119 sophomore medical students and their ten instructors. Data collected during the experiment included student cumulative raw grades on three departmental (institutional) exams, class performance relative to a national norm on the National Medical Board exam, and student ratings (obtained from 78 of the sample population) of the course organization and instructor presentation. Gessner explains the weighting and statistical processes employed to allow comparisons between and among these variables. Gessner found that correlation coefficients for the two measures of teaching effectiveness (class performance on twenty areas of the national exam and student ratings of course content and course presentation) were .74 and .62 respectively (P less than .001). On the other hand, the correlation between class performance in twenty subject areas on departmental and national exams was low ($r = .18$). The correlation between class performance on department exams and student ratings was also low ($r = .11$ for organization of content; $r = .17$ for presentation). Gessner believes the reason for these latter low correlations is partially related to how class performance was computed, but he also hypothesizes that use of class performance on internal or departmental exams is not an adequate measure of teaching effectiveness. Class performance on national exams, however, may be a good measure of teaching effectiveness, if one could guard against locking instruction into curricula covered by the exam.

It is probable that the ability to judge teaching effectiveness by student performance on national normative exams is related to consensus on theory, skills, necessary knowledge, etc., among the practitioners of the discipline. Consensus is probably high in medicine and in calculus (the focus of the Rodin study). In the social sciences and the humanities, where consensus is lower, Gessner's suggestion for judging teaching effectiveness may be less appropriate.

Getzels, J. W., and P. W. Jackson. **"Research on the Variable Teacher: Some Comments,"** School Review, 1960, 68, 450-462.

Getzels and Jackson make two points: 1) the image of the teacher and his role has undergone (and will continue to undergo) significant change so that many images of the "good" teacher exist, and 2) teacher research which focuses mainly on variables of "teacher-ship" (i.e. personal traits) for predicting basis is outdated. The authors warn against an uncritical acceptance of positive or negative correlations between individual traits and teaching effectiveness and call for more systematic research which would explain the relationships. Essentially, they ask for research that will ask what is effective teaching rather than who is an effective teacher. Contributions such as this marked a turning point in the educational research on this topic.

Hall, Douglas T. **"The Effect of Teacher-Student Congruence upon Student Learning in College Classes,"** Journal of Educational Psychology, 1970, 61, 205- 213.

The investigator tested the hypothesis that the higher the congruence between a teacher's style and a student's ideal instructor style, the greater will be student learning. The assumption is made that a student is aware of instructor behavior which is most suited to his individual learning style. In the study, questionnaires were given to undergraduate humanities and social science classes at Yale, with 238 students responding. The questionnaire contained 35 items describing a range of behaviors for "Teacher Style" and "Ideal Teacher Style." Data on Teacher Style, obtained from teacher and students, were correlated. Student learning was then measured by a 26 item questionnaire describing students' perception of what they learned. Various statistical methods were utilized to correlate learning with Teacher Style, Ideal Teacher Style, and Teacher Style minus Ideal Teacher Style discrepancy. Results did not support the hypothesis. The congruence between a student's rating of ideal teacher behavior and his teacher's actual teaching style did not predict learning as well as the actual teaching style ratings alone. The investigator concluded that the result of the study is a sad commentary on the present role of the student for it shows that the most effective way to predict learning is to examine the teacher alone, not the teacher in relation to the student.

Hartley, Eugene L., and Thomas P. Hogan. **"Some Additional Factors in Student Evaluation of Courses,"** American Educational Research Journal, 1972, 9, 241-250.

The article's concern is with evaluation of teaching by emphasizing students' estimates of their own self-development, as opposed to evaluation mechanisms which focus on teacher and course content. The authors gave two questionnaires to students in psychology classes at the University of Wisconsin, Green Bay. One was teacher/content oriented while the other asked questions about student awareness, thinking ability, involvement, and analytical skills developed during the semester. Analyzing 450 responses, the investigators found little correlation between the two instruments. A professor could receive a high rating for his technical expertise in teaching, apparently without affecting the student as a human being or without developing self-awareness in the student. The investigators strongly suggest that research continue on all aspects of evaluation rather than restricting course evaluations to the currently available questionnaires which would seem to be too mechanical in light of their research.

Hildebrand, Milton, et al. **Evaluating University Teaching.** Center for Research and Development in Higher Education, University of California, Berkeley, 1971.

The informative handbook succinctly discusses development of a flexible teaching evaluation instrument for the California University system. Contents of the pamphlet include the process of developing teacher description scales; the ratings of teachers as they related to characteristics of courses and students; and a general discussion of the concept of evaluating teaching effectiveness. A four-page bibliography is a useful reference.

Hind, Robert R., et al. **"The Evaluation of University Teachers: An Application of a Theory of Evaluation and Authority,"** Stanford Center for Research and Development in Teaching, Technical Report #37, (December, 1972).

Hind, Dornbush and Scott interviewed 100 professors of all ranks at Stanford on professorial perceptions of the teaching/research evaluation system. The investigators found that professional colleagues are the most influential evaluators (more important than any administrative superior) in both research and teaching. The study found that the individual being evaluated believes visibility of performance is the only sound basis for evaluation. Therefore in research, colleagues at the university and those at other institutions are the best judges of one's work. In teaching, student opinion ranks high with professors, but there was no agreement on the degree of quality of student evaluations.

The study found Stanford's reward system biased toward research rather than teaching. Younger professors, more mobile in a perceived national and international market, tend to emphasize research more than older faculty. Yet both age groups expended considerable time and effort on teaching and wanted better balance in the reward system. There was no agreement, however, on making research and teaching equal in the promotion/tenure process. A professor's satisfaction with the evaluation process is directly associated with the degree of consensus on theory within his discipline, the study indicated. Agreement on theory generates agreement among evaluators, and is the basis for collegial evaluations.

The study concluded that ". . . visibility of research in a national and international market, and the lack of visibility of teaching to persons outside the university were major factors preserving the existing reward system." Nevertheless, faculty dissatisfaction with de-emphasis of teaching does provide an opportunity to redress the imbalance between effort and reward.

Hodgkinson, Harold. **"How to Evaluate Faculty When You Don't Know Much About Them,"** The Research Reporter (Center for Research and Development in Higher Education, University of California in Berkeley), 1972, 7 (2), 5-8.

Hogkinson states that an effective reward and assessment system for the university must take into account the needs of the individual (the professor) and the needs of the organization (the university). Consequently there is a need to know more about professors—their aspirations, goals, how they are motivated, by what do they feel threatened. Also, there is a need to understand how organizational imperatives change over time as new skills and new leadership are required. Hodgkinson feels that recent studies have not adequately dealt with these two topics. He states what he believes to be the goals of faculty assessment and reward processes: improve performance, not reject the teacher; encourage collaboration among faculty, not competition; and, encourage innovation. Hodgkinson offers three options for assessing a professor's teaching: a "growth contract" whereby a professor plans long range objectives on which he wants to be evaluated; observation in the classroom by colleagues; and self-evaluation through use of video-taping.

Hoyt, Donald P., and Ronald K. Spangler. **"Faculty Research Involvement and Instructional Outcomes,"** Office of Educational Research, Kansas State University, Manhattan, Kansas.

The study investigated whether a relationship exists between faculty research and instructional outcomes. As a related issue, Hoyt and Spangler attempted to determine if a relationship exists, whether it is different in two major disciplines: social/behavorial sciences and the natural/mathematical sciences.

Faculty at Kansas State University, totaling 183 members evenly divided between the two disciplines, volunteered for the project. They administered the University's teaching evaluation form to their students. A custom-made device for measuring faculty research involvement in terms of time commitment and accomplishment was administered to department heads. Based on this device the faculty members were divided into three groups designated as "Little," "Moderate," or "Considerable" research.

Data collected from the student evaluation forms were analyzed 1) to determine rating differences between faculty in the two sciences; 2) to relate the teaching evaluations to the three groups of faculty based on research involvement; and 3) to relate the teaching evaluations to the two disciplines grouped separately by the degree of research involvement.

When student evaluations and the research involvement data were related to disciplines the data revealed these differences:

1. The social/behavioral science courses required significantly more reading, but the natural/mathematical science courses required greater amounts of other kinds of work and were perceived as more difficult by students.
2. On ten questions dealing with student progress, six reflected significantly higher scores for the social/behavior sciences, one favored natural/mathematical sciences, and no difference occurred on three questions.
3. End of course ratings of the instructor and interest in the field were not significantly different between disciplines.
4. Faculty in the natural/mathematical sciences were more involved in research activities than the social/behavioral science faculty.

When student evaluations were related to faculty research involvement, data showed:

1. Significant differences existed on two measures involving course characteristics: amount of reading and perceived difficulty. These were related in linear fashion to research involvement. Faculty members more heavily committed to research were seen by students as requiring more reading and as designing more difficult courses.
2. On one measure of student progress (gaining broader appreciation for intellectual/cultural activities) faculty members involved "considerably" in research were rated significantly higher than the other two groups.

When student evaluations were related to research involvement by discipline, data showed trends clearly differentiating the two sciences. On four measures of student progress (development of specific skills, learning the discipline's methods, learning to apply course material to problem solving, and development of a sense of personal responsibility) ratings steadily increased as the instructor's level of research involvement increased in the natural/mathematical sciences. The reverse pattern occurred for faculty in the social/behavioral sciences; here ratings declined as research involvement increased. The authors conclude that a relationship does exist between teaching effectiveness and research development; on at least four measures there is a positive relationship in the natural/mathematical sciences and a negative relationship for the social/behavioral sciences.

The authors posit several explanations for all their findings, especially for the last mentioned one. They refer to the expectations of students when they enroll in certain courses. Expectations and abilities are based on high school preparation which, for research skills, is usually more sophisticated in the hard sciences. There is generally more extramural funding for the hard sciences which often frees a professor from some teaching duties. The authors also draw attention to the crucial limitations of the study: there was no scientific sampling of the faculty; the division of discipline may be unnatural; the results were gained from one study over one year; and the reliability and validity of the research involvement scale was not established. The study, it should be noted, also assumed teaching and research as going on simultaneously rather than attempting to assess the influence that research has on a scholar after he comes back into the classroom.

Hutchison, Jerry. **"Faculty and Student Attitudes Toward Evaluation of Teaching,"** Educational Research and Methods, 1974, 7 (1), 9-11.

Hutchison gives a brief background to the origin of student evaluation noting how student interest and involvement has waned at the same time universities have begun to use student evaluation in the process of faculty promotion and tenure. As student interest decreases, professional anxiety increases because, as Hutchison explains, faculty traditionally have been expected to master one set of skills (mainly research in their discipline), but now they are being measured by another set of skills (teaching skills). Hutchison has several suggestions as to how to create a mood of cooperation and receptivity to programs designed for faculty development: 1) programs must be under the auspices of faculty, not students, and should stress improvement, not evaluation; 2) the program must be flexible recognizing many models of effective teaching; 3) the program should emphasize individual growth and change according to one's own objectives; and, 4) programs should emphasize that students are reporting perceptions, not making evaluations.

Levinthal, Charles F., et al. **"Student Evaluations of Teacher Behaviors as Estimates of Real-Ideal Discrepancies: A Critique of Teacher Rating Methods,"** Journal of Educational Psychology, 1971, 62, 104-109.

The study focuses on one of the problems inherent in most current teacher evaluation systems: student ratings of teachers may be actually estimates of discrepancy between a student's own ideals of teacher behavior and his teacher's actual behavior. In this experiment, students rated their teachers on an overall teaching ability evaluation. Then they rated teachers on nine specific behaviors with a frequency scale of one to five (almost never to almost always) to determine which behaviors each student observed in the classroom. Finally, the students rated the nine specific behaviors on a five-point personal desirability scale. The nine attributes or specific behaviors were chosen from a study done by McKeachie and others (1964) which were found independent of general teaching ability. The attributes were grouped around these concepts: work overload, organization, feedback, interaction, and rapport. Students were to rank each attribute or behavior as undesirable, acceptable, or highly desirable. In evaluating the data, the investigators found that there was little student agreement on desired behaviors, or on observed frequency of teacher behaviors. On only one behavior, "He was friendly," was desirability and frequency scores near unanimous (i.e., students agreed on its desirability and its frequency of almost always). The investigators concluded that direct assessment of students' values are relevant for understanding teacher ratings, and more attention should be paid to this factor in teacher evaluation.

————, **"Measurement and Prediction of Teaching Efficiency: A Summary of Investigations,"** Journal of Experimental Education, **1948, 16** (4), 203-283.

The monograph is a detailed summary of some 150 studies relating to measuring and predicting teacher "efficiency" written since 1900. The data is presented in tabular form reporting the following about each study: 1) author, 2) criterion of efficiency, 3) number of case studies, 4) aspects of teachers and teaching studied, 5) research method, 6) major findings. Many of these early studies on "efficiency" were asking similar questions as studies today on teaching effectiveness, and thus this report offers relevant information for historical perspective. It should be noted, however, that the two terms indicate a major change in thinking about education and its objective.

Morsh, Joseph, et al. **"Student Achievement as a Measure of Instructor Effectiveness,"** Journal of Educational Psychology, **1956, 47, 79-88.**

This study attempted to develop a reliable criterion of instructor effectiveness. The effectiveness measure was based on the extent of student gains in learning the subject material. A sample of 106 students was drawn from a seven day Mechanics course at Sheppard Air Force Base. The students had been given a pretest consisting of items related to prior knowledge of hydraulics. After the seven day session they were given a post test related closely to the material taught in class. The difference in the two tests was the measure of "student gains." Besides information on student achievement, independent measures of instructor ability were obtained through supervisor ratings, ranking by colleagues, student evaluation, Wonderlic Personnel Test of instructor intelligence, and instructor knowledge measured by proficiency exam.

Students' overall rating of instructors was significantly correlated with total student gains. Peer rankings, supervisor ratings and instructor's achievement on proficiency tests and on the intelligence test did not correlate with student gains. Even though peer and supervisor ratings were not similar to students' evaluation of instructors, they were similar to each other suggesting that supervisors and peers judge instructors on factors other than student gains criteria, such as knowledge of the discipline.

McKeachie, Wilbert J. **"Research on College Teaching: a Review,"** Report #6, ERIC Clearinghouse on Higher Education: George Washington University, November, 1970.

The review discusses research on college teaching carried out from 1924 to 1970. McKeachie, a well known scholar of higher education, is chairman of the Psychology department at the University of Michigan. Here, he summarizes and briefly analyzes studies on class size, lecture and discussion, student and instructor centered teaching, printed material and programmed learning, independent study, and student characteristics as these factors relate to effective teaching. McKeachie concludes that after 50 years of research, some of the same methodological problems exist: end of course examinations are still used as "outcome measures" though tests have been proved insensitive; ways to measure critical thinking, attitude change, or motivation have not been constructed; and much of our information derived through research is valid only for a given culture at a given time. As for teaching methods, McKeachie believes that research has shown no one method is best for all goals, all students, all teachers. A variety of methods should exist on a campus and in each classroom, and teachers should develop a repertoire of skills. Students, within a course, should be allowed options for maximizing their own motivation and learning.

Oles, Henry J. **"Stability of Student Evaluations of Instructors and their Courses,"** Psychology Department, S.W. Texas State University, (unpublished paper).

A course/instructor evaluation form, specifically designed for this investigation, was given initially to 1302 undergraduate students both as a pre-test (after the first meeting of class) and as a post-test at the end of the semester. The evaluation form contained 23 items dealing with teacher, course, text, tests, grade expectation, etc. Pre-tests and post-tests were matched and compared for 775 students. Comparing results of the two, the investigator found that the median pre-, post-test correlation for all items was .60 with a range from –.11 (amount of information learned) to +.86 (course difficulty). Students reported less interest in the course, expected a lower grade, found teachers explanation more inadequate, and saw less value in attending class at the end of the semester than at the beginning. However, they did see exams and grading as being more fair at the end of the course than they expected at the beginning. Overall there was a definite tendency on both tests to rate instructors positively. Oles believes that the study demonstrates that "Students are able to form relatively lasting appraisals of their course and instructor after minimal exposure."

Pambookian, Hagop. **"Initial Level of Student Evaluation of Instruction as a Source of Influence on Instructor Change after Feedback,"** *Journal of Educational Psychology*, 1974, 66, 52-56.

The study assesses the impact of student feedback on teachers. In fall, 1971, 252 students in 13 educational psychology sections were asked to rate their instructors with a 21 item questionnaire. The instructors also repsonded to the questionnaire as to how he perceived his own teaching. Ten days later the researcher presented the results of the student questionnaires to instructors who had been grouped by "favorable," "moderately favorable," and "unfavorable" evaluations. The researcher gave no advice on how the instructor should respond to the evaluation data. Eight weeks later another questionnaire was administered. The researcher was interested then in measuring the change in teacher behavior between the two questionnaires. He discovered that instructors who had been initially rated "moderately favorable" changed their teaching behaviors significantly and positively. They explained subject matter more clearly; they became skillful in observing student reactions; they were more stimulating; and, they increased interaction and rapport with students. Those instructors initially evaluated "favorable" tended to regress toward the mean. There was little change in those instructors who were rated "unfavorable."

The implications for instruction from the study include these: in giving feedback to teachers, the initial level of performance should be taken into consideration; teachers should be assisted in the development of skills to make better use of feedback information; and, means other than reliance on the impact of evaluation should be explored for helping those whose teaching is poor.

Perry, Raymond R., R. R. Niemi, and Keith Jones. **"Effect of Prior Teaching Evaluations and Lecture Presentation on Ratings of Teaching Performance,"** Journal of Educational Psychology, 1974, 66, 851-856.

Students in introductory psychology at University of Manitoba were divided into two groups. One was introduced to a professor through biographical data which included a very favorable evaluation of his teaching. The other group was introduced to the same professor, but the biographical data included a negative teaching evaluation. After the lecture, the subjects completed a 16 item evaluation questionnaire. The investigation revealed that prior expectations of teaching performance influenced significantly ratings of the professor in several dimensions, with the positive evaluation group rating the professor much higher than the negative evaluation group. These results should probably be treated skeptically. The article was written on the basis of one experimental situation, and the professor who acted in the experiment did not deliver the same lecture in the same manner to both groups.

Rabinowitz, William, and Robert Travers. **"Problems of Defining and Assessing Teacher Effectiveness,"** Educational Theory ( ), 212-219.

Though written nearly 25 years ago, the article is current in both its focus and content. Drawing attention to the abundance of research on teaching competence by 1950, the authors discuss persistent problems recurring in that research: 1) defining teaching effectiveness and 2) measurement of it. They criticize the simple formula of judging effectiveness of teachers in terms of pupil growth and discuss several drawbacks to the psychological framework of stimulus-response when applied to educational situations. Recognizing the inherent complexity in the study of teacher effectiveness, the authors call for artifically simplified teaching situations to deliberately introduce control in attempts to establish consensus on the above mentioned problems. These ideas are basically those which Gage, in 1963, discussed as the "micro criteria" of teaching.

Rayder, Nicholas. **"College Student Ratings of Instructors,"** Journal of Experimental Education, 1968, 37, 76-81.

The research studies the question of whether student characteristics are most-directly associated with high ratings. Data was compiled from 5,000 college students who rated their instructors on each of 3 criteria. These ratings were then correlated with selected student characteristics and instructor characteristics by multiple linear regression techniques. The results showed that the ratings of instructors were more positively related to instructor characteristics (such as aloofness or friendliness, planned or unplanned classes, routine or stimulating activities) rather than student characteristics (such as age, grade level, GPA or previous grades from same instructor).

Robinson, Lora H. **"Improving College Teaching Through Faculty Selection and Evaluation: A Review,"** Currents '70, (ERIC Clearinghouse on Higher Education), #2, July, 1970.

The article briefly reviews books and articles recently written which emphasize two methods of improving college teaching: faculty selection and faculty retention. In the past, faculty selection process has not emphasized an applicant's teaching experience, interest, style and training. When groups call for greater attention to be paid to an applicant's teaching expertise, they also imply the need of a reliable measuring device to assess teaching competence. This then ties in with faculty retention, for if effective teaching is to be used as a criteria for keeping one's job (in addition to criteria of research and publication) the tool used for measuring teaching must be valid. Thus, the two methods of improving teaching upon which she focuses interrelate with the need of adequate measuring of teaching.

Rodin, Miriam, and Burton. **"Student Evaluation of Teachers,"** Science, 1972, 177, 1164-1166.

The purpose of the Rodins' study was to assess the validity of student evaluations by comparing the objective criteria of teaching (i.e., what students have learned from the teacher) with subjective criteria (i.e., student evaluations of teacher effectiveness). The instructors studied were Teaching Assistants (T.A.'s) in an undergraduate calculus course who met with students in small student-chosen recitation sections 2 days a week. By analyzing student performance on exams and student ratings of the T.A.'s at the semester's end, the Rodins found that a negative correlation existed between amount learned from an instructor and students' evaluation of his teaching ability. The authors hypothesize a few reasons for this. Students may resent teachers who make them work too hard, or make them learn more than they desired. Or, perhaps, as students build up expertise in a field, they are more capable of seeing teachers' weaknesses. The Rodins conclude good teaching is not validly measured by student evaluations in their present form. However, Peter Frey disagrees with the Rodin study both in methodology and outcome (see review of his article, this section).

Ronan, W. W. **"Evaluating College Classroom Teaching Effectiveness,"** PREP Report #34, U.S. Department of Health, Education and Welfare, Office of Education. (DHEW Publication # (OE) 72-9)

Students at the George Institute of Technology identified through observation and the "critical incident technique," some 3,000 incidents which they described as "best" or "worst" teaching. The incidents were categorized into behavioral areas which describe ineffective or effective teaching. This pamphlet lists the categories and subcategories of behaviors thusly developed, describes them individually, and hypothesizes effects on student achievement and attitudes. Categories which describe both effective and ineffective behaviors include these: 1) personal relationships with students (such as showing friendliness to all students or showing favoritism), 2) classroom administration (such as offering and following a course syllabus or failing to state objectives of the course), 3) student participation (permitting class discussion and debate or not permitting it), 4) classroom presence (lecturing, in a clear distinct manner, or lecturing in a rambling monotone), 5) organization and presentation (such as relating material to real world or theorizing without demonstrating applicability), and, 6) evaluation of student performance (such as testing one's understanding of principles or testing for memory).

Sherman, Barbara, and R. T. Blackburn. **"Personal Characteristics and Teaching Effectiveness of College Faculty,"** Journal of Educational Psychology, 1975, 67, 124-131.

This study attempted to discover the relationship between faculty personality traits and teaching effectiveness. Fifteen hundred students evaluated 86% (105 persons) of the faculty at a small liberal arts college. Three evaluation forms were used. One stressed classroom procedures, methods, management, and course content. Another stressed rapport and attitude toward students. The third instrument was the Osgood Semantic differential test consisting of bipolar adjective pair items descriptive of various personality characteristics. Results from student evaluation on the three forms were compared through factor analysis, analysis of variance, and multiple regression. The study revealed: 1) personality and teaching effectiveness were highly correlated (.77), and 2) "dynamic, pragmatic, amicable and highly intellectually competent faculty" received significantly higher ratings than did faculty leaning toward the opposites of these traits. The investigators conclude although skills in classroom management are a necessary condition for effective teaching, they are not sufficient. The personal qualities the instructor brings into the classroom are more often the crucial determinants between success and failure as a teacher. Sherman and Blackburn go on to suggest that a professor who wishes to improve his perceived effectiveness may best begin on personal attributes rather than course functions and activities.

Smock, H. Richard. **"Evaluating College Courses: Problems and Progress,"** Paper presented at the 1974 American Psychological Association's annual meeting in New Orleans.

Smock believes the major problem with current programs for evaluating college courses is the lack of a clear purpose for which the information is collected. Smock believes there are three distinct levels for which information may be collected and used by certain people for certain purposes, and therefore, the questions designed for each level should focus only on those purposes. According to Smock, Level 1 information serves administrative and comparative purposes. The questions asked here must be general but applied university-wide, and should have agreed-upon face validity to students and administrators. The items should not be based on a particular belief about what constitutes effective teaching, but should ask general questions as to overall course effectiveness. Level 2 items are designed to give professors diagnostic information about their teaching. These questions should be common to a large segment of teachers, should have face validity, should be about aspects of instruction for which students are competent judges, and should concern behaviors over which an instructor has control. Level 3 items are designed to probe more deeply into problem areas suggested by Level 2. Level 3 questions may be more specific, perhaps even department-specific, may be open-ended, and may allow the student the option of explaining earlier responses.

Tuckman, Bruce, M. M. Kendrick, and Ronald Hyman. **"The Modification of Teacher Behavior: Effects of Dissonance and Coded Feedback,"** American Educational Research Journal, 1969, 6, 607-619.

The purpose of the study, similar to that of Doyle and Redwine in this bibliography, was to determine if teachers, who gain information about their classroom behavior which differs noticeably from their self-perception, would change either their perception, their behavior, or both after feedback. Twenty-four experienced high school teachers' class behaviors were coded using a classroom analysis technique. The teachers also completed a self-perception inventory on which they estimated the percentage of class time devoted to various teaching categories (i.e., teacher talk, student talk, silence, etc.). The teachers were divided into two groups based on the degree (high or low) of discrepancy between actual and self-perceived behavior. The teachers in the two groups were then assigned to one of three groups. One group was given verbal feedback as to the amount of discrepancy and were shown the classroom analysis process; the second group listened to a tape recording of their class, but were given no information about the classroom analysis or the degree of discrepancy; the third group received no feedback whatsoever. Three weeks after the introduction of treatments, the teachers' behaviors were coded again, and again they completed the self-perception inventory. The investigators then studied the change in: 1) discrepancy scores, 2) self-perception scores, and 3) teacher behavior.

The investigators found teachers with high discrepancy between actual and perceived behavior changed significantly more (they lessened the discrepancy) than did low discrepancy teachers on an absolute as well as percentage basis. There was significantly greater change in the verbal feedback group than in the other two groups. With regard to self-perception, the verbal feedback treatment had no differential effect on changes in perception, but the high discrepancy teachers changed total perception across all treatments. With regard to behavior, high and low discrepancy groups did not change their behavior differentially. However, verbal feedback treatments produced a significant change in behavior as compared with the control group.

The investigators concluded that the "behavior and self-perception of experienced, in-service teachers can be changed by invoking a discrepancy between a teacher's observed behavior and his own self-perception of his behavior, and then making him aware of this discrepancy via verbal feedback."

Voeks, Virginia, and Grace French. **"Are Student Ratings of Teachers Affected by Grades?"** Journal of Higher Education, 1960, 31, 330-334.

Two experiments were undertaken at the University of Washington in spring, 1952. Student ratings of professors were compared with the grades those professors had assigned. No relationship existed between grades and subsequent student ratings for the distribution as a whole. Next the investigators selected from each of ten large departments the teacher with the highest student rating and the one with the lowest. For each, the mean of all grades he assigned during the preceding terms were computed. Again, no correlation was discovered: in 5 of the 10 pairs, the teachers with highest and lowest ratings did not give significantly different grades; in 4 pairs, the top teacher gave significantly higher grades than the bottom teacher; in one pair the top teacher gave significantly lower grades. The investigators conclude that students do judge an instructor's overall value as a teacher and his specific skills, rather than by the grades they receive from him.

Witheiler, Paula, and Harold Yuker. **"Course Evaluations at Hofstra University, 1969."** Report #90 (March, 1970), Center for the Study of Higher Education.

The report discusses a four semester plan of course and teacher evaluation implemented at Hofstra from 1968 to 1970. It offers a statistical analysis of the schools who submitted to evaluation and reactions from undergraduates, graduates, and faculty. It lists, in order of importance, the teaching behaviors students found to be most and least effective. Hofstra's evaluation process ended in 1970, however, in order to discuss the goals and uses of such an evaluation process. The goals which determine the construction of the evaluation instrument and the questions that must be answered are: Should such evaluation be diagnostic for the teacher? Or should it provide information about courses to students? Or should it be used in the tenure and promotion process?

The conclusions reached were:

"1) If the goal is to provide feedback to the instructor so that he can evaluate and improve his teaching, evaluation should be voluntary. Each instructor should decide how to evaluate, using the services of the Computer Center where appropriate. Results could be confidential.

"2) If the goal is to provide information to students, all (or almost all) courses should be evaluated by all of the students (or at least a representative sample of students), and the results must be made public.

"3) If the goal is to provide information to department chairmen and deans that would be useful in making decisions regarding retention, promotion, salary increases, or tenure, the evaluations could either be university-wide, or could be selective in terms of the course sections evaluated. It would be necessary to obtain the responses of all or most of the students in a given class, and the results would be made available to appropriate administrators.

"4) If the goal is to provide a profile of the University and the schools and departments within the University, this was accomplished by the evaluations in 1969. Similar evaluation could be conducted every three to five years in order to keep the profile current."

Wood, Kenneth, Arnold Linsky, and Murray Straus. **"Class Size and Student Evaluation of Faculty,"** Journal of Higher Education, 1974, 45, 524-534.

The study was based on data collected from over 4,000 courses at 16 universities in the United States. The source of the data was each of the university's student evaluation tools, which were made more uniform through use of various statistical procedures. The investigators refused to dichotomize their data into "large" and "small" class categories as most researchers on this topic have done, but instead viewed the entire range of class size from under ten to over 500 students. The study revealed that student ratings of courses have a curvilinear relationship to class size. Ratings for classes under 10 students were high, but ratings dropped off as classes increased to around 250 students whereupon ratings begin to increase again as size increased to 500 or more students. The investigators indicated that this relationship was not a factor of instructor experience or rank, and hypothesized that the relationship was more directly related to bias against large classes by university administrators. As classes grow over the "ideal" of 10 or 20 students, often because of financial stringencies, both professors and administrators refuse to adapt and continue to teach large classes as if they were small. They reap poor ratings. Beyond the number of 250 students, the department reaches the realization that a large class necessitates a new teaching style, more effort, and probably different techniques and technology. The department may then seek out a professor whose style and temperament is conducive to large class atmosphere. Such responses or adaptation cause higher ratings. The investigators conclude there is no inherent reason for student ratings of classes in the range of 60 to 250 to be low. It is only that the problem of large classes has not yet made itself felt.

Focus on Basic Works

Bloom, Benjamin S. (Ed) **Taxonomy of Educational Objectives: Classification of Educational Goals—Handbook I, Cognitive Domain.** New York: David McKay Company, 1956.
See a brief explanation under Krathwohl in this bibliography.

Bloom, B. S., J. T. Hastings, and G. F. Madaus. **Handbook on Formative and Summative Evaluation of Student Learning.** New York: McGraw Hill, 1971.

This large book is a current statement on the development and uses of a taxonomy of educational objectives. The handbook includes specific applications of the taxonomy to various subject areas, including evaluation of learning in language arts, science, secondary school mathematics, literature, writing, and physical education. Concepts and techniques discussed are generalizable from elementary and secondary education to university teaching.

Broudy, H. S., M. J. Parsons, I. A. Snook, and R. D. Snoze. **Philosophy of Education, An Organization of Topics and Selected Sources.** Urbana, Illinois: University of Illinois Press, 1967.

This comprehensive reference is the result of three years of research into the philosophical dimensions of educational problems. The project was sponsored by the United States Office of Education and the University of Illinois. The book is a carefully organized, annotated listing of books and articles dealing philosophically with the nature and the aims of education, curriculum, organization and policy, and teaching and learning. The book also lists selected titles in epistomology, metaphysics, ethics and value theory, aesthetics, logical and linguistic analysis, etc. It is a good source for ascertaining the philosophical dimensions of various educational activities and/or locating readings on those topics.

Cartwright D., and A. Zander. **Group Dynamics Research and Theory.** (3rd ed.) Evanston, Illinois: Harper and Row, 1968.

The work is a series of articles organized into basic topics on groups and group membership, uniformity in groups, power and influence, leadership and performance, motivational processes, and instructional properties of groups. The concepts are applicable to university classroom groups.

Cronbach, L. J. **Educational Psychology.** (3rd ed.) New York: Harcourt, Brace and World, 1972.

Cronbach is one of the leading educational psychologists in this country. His views on topics relative to instruction and evaluation are pertinent and insightful. This book was written for elementary and secondary teachers, but the concepts are certainly applicable to university teaching. Of particular value are Chapter 2, "What Teachers are Trying to Accomplish," Chapter 3, "An Introduction to the Learning Process," Chapter 10, "Intellectual Development as Transfer of Learning," Chapter 11, "Improving Understanding and Thinking," Chapter 12, "Communicating Knowledge," Chapter 14, "Purposes and Aspirations," Chapter 15 on the teacher as the classroom leader, and Chapter 16, "Judging Performance."

Ebel, R. L. (Ed.) **Encyclopedia of educational research.** New York: Macmillan, 1969.

The work is a 1,500 page compilation of research providing succinct overviews of numerous aspects of education and useful lists of original sources. Of particular interest to university instructors are the articles on objectives and outcomes, curriculum, educational programs, psychology of learning, instruction, community college education, graduate education, correspondence instruction, extension education, and financing of colleges and universities.

Gage, N. L. **Handbook of Research on Teaching.** Washington: American Educational Research Association, 1972.

Gage's work is a worthy complement to Ebel's Encyclopedia (listed previously). Chapters include the history of the impact of research on teaching, contemporary models of teaching, use of direct observation to study teaching, the assessment of teacher competence, the technology of instructional development, critical value questions in the analysis of objectives and curricula, social psychology of teaching, the teaching of affective responses, gaming and simulation, and research on teaching and higher education. In addition, a section of articles reports the results of research on the teaching of various subjects.

Krathwohl, D. R., B. S. Bloom, and B. B. Masia. **Taxonomy of Educational Objectives: the Classification of Educational Goals—Handbook II, Affective Domain.** New York: David McKay Company, 1964.

This work complements the Taxonomy of Educational Objectives: the Cognitive Domain, by Bloom, et al., 1956, mentioned previously in this bibliography. The Cognitive Domain was the original effort of a group of psychologists and educators to classify and order types of learning, educational outcomes, or educational objectives to make knowledge acquisition more orderly and coherent for the learner as well as the teacher. The project was to work towards an agreed upon taxonomy which could be used as a common vocabulary for educators in an effort to make educational research additive, and in the construction of pedagogical experiences.

The work on the cognitive domain deals with recall or recognition of knowledge and the development of intellectual abilities and skills. Knowledge, comprehension, application, analysis, synthesis, and evaluation are the intellectual steps in the cognitive taxonomy which are analyzed, and presented with illustrative material.

The affective domain centers on attitudinal objectives of instruction and learning and deals with interests, attitudes, values, appreciation, etc. The taxonomy includes the following levels: 1) receiving (awareness, willingness to receive, selected attention); 2) responding (acquiesence in responding, satisfication in response); 3) valuing (acceptance of a value, preference for a value, commitment); 4) organization (conceptualization of a value system); and 5) characterization of a value or a value complex. A full explanation of the assumptions and goals of the entire project constitutes the first ninety pages of both works.

Travers, R. L. **Handbook of Research on Teaching.** Washington: American Educational Research Association, 1975.

The most recent book in the series (see Gage, listed previously) is edited by Robert Travers. One section of articles provides an updating of the work on the improvement of teaching in the various subject areas. The book provides reviews of several concepts not contained in the earlier book, reflecting the recent pace of educational research and innovation and the increasingly specialized nature of research. Chapters on "ideas" as well as reviews of research are presented.

PART VII: A Directory of Audio Visual Services and Special Contacts

Available on the Lawrence Campus of the University of Kansas

This directory is one result of the work of the Task Force on Communications, convened by Chancellor Emeritus Raymond Nichols and chaired initially by Bruce Linton. The Task Force worked to develop policies and procedures which will help teachers better acquire, utilize, and maintain audio visual equipment for instructional use. Professor Ralph Christoffersen, Assistant Vice Chancellor for Academic Affairs, continues the work toward the objectives of the committee.

One of the first efforts of the Task Force was to survey the existing audio visual resources on campus. Such a survey, as would be expected, was a difficult and time consuming task. To enable the committee to conduct the survey, the Endowment Association provided the Office of Instructional Resources with funds to secure the expert and conscientious assistance of Sally Six Hersh. The directory is a small part of the information which she gathered through questionnaires and follow-up interviews. A few items have been added, but the work is Sally's.

It is hoped that the directory will help us all to better utilize and select audio visual equipment.

A Directory of Audio Visual Services and Special Contacts

by Sally Six Hersh

I. **Basic General Service Areas for Audio Visual Information.**

- A. **Audio Visual Department—Continuing Education**
  Ross Wulfkuhle, 2 Bailey Hall, 864-3306.
- B. **Cablevision Teaching,** Microwave Interlock with K.U. Medical Center, State Television Interlock—Continuing Education
  James Nabors, Coordinator of Instructional Television, 864-3284.
- C. **Audio-Visual Center Film Rental Service**
  Breck Marion (manager), 746 Massachusetts Street, 864-3352.
- D. **Photo and Graphic Arts**—All types of photo and graphic arts advice and production available for your department to improve teaching. Contact office for services and price list.
  Ed Julian, S-B Watson, 864-4767.

II. **Specific Information Areas on the Audio Visual Fields.**

- A. **Audio:** (Record Players, Sound Systems, Tape Recorders)
  1. Equipment available for classroom use. Call to make arrangements. Audio Visual Department—Continuing Education, Ross Wulfkuhle, 2 Bailey Hall, 864-3306.
  2. Duplication of Audiotapes (reel to reel, reel to cassettes, cassettes to cassettes, etc.), Language Labs. Call to make an appointment. Ermal Garinger, Wescoe Hall, 864-4759.
  3. Recording Information for Special Professional Audio Quality. Station KANU—Richard Wright, Director, 113 Broadcasting Hall, 864-4530. Tom Doyle, Studio and Control Engineer.
  4. Repair of Audio Equipment, Advice and Consultation.
     - a. Radio, T.V., Film Department—Technical Studio. Rod Davis, 217 Flint Hall, 864-3282 or 843-3991.
     - b. Bureau of Child Research
       Electronics Lab—John Trewalla, 296 Haworth, 864-4696.
       Bureau Office, 223 Haworth Hall, 864-4295.
     - c. Audio Visual Department—Continuing Education, Ross Wulfkuhle, (very limited on time), 2 Bailey Hall, 864-3306.

5. Departments and Bureaus with Large Holdings and High Use of Audio Equipment.
    a. Bureau of Child Research—Ross Copeland, 223 Haworth Hall, 864-4295.
    b. Education Curriculum Lab—Robert Ridgway, 213 Bailey Hall, 864-3464.
    c. Language Labs—Ermal Garinger, Wescoe Hall, 864-4759.
    d. Music Education—George Duerksen, 311 Bailey Hall, 864-4784.
    e. Music Library (History)—448 Murphy Hall, 864-3496.
    f. Psychology (Clinical)—E. Wright, 305 Fraser Hall, 864-4121.
    g. KANU/KFKU—Richard Wright, Broadcasting Hall, 864-4530.
    h. KUOK—Sudler Place, 864-4746 or 864-4991.
    i. Audio Reader—Sudler, 864-3206.
    j. Speech and Hearing Clinic—James Lingwall, 290 Haworth Hall, 864-4690.
    k. Speech Pathology Department—James Neelley, 290 Haworth Hall, 864-4690.

B. Film: (8 mm, 16 mm, Sound Projectors, etc.)

1. Equipment Available for Classroom Use.
    a. Projectors and Screens—Audio Visual Department—Continuing Education—Ross Wulfkuhle, 2 Bailey Hall, 864-3306.
    b Films.
        (1) Audio Visual Department—Continuing Education—Ross Wulfkuhle, 2 Bailey Hall, 864-3306.
        (2) Film Library, Continuing Education—Breck Marion, National Bank Building, 746 Massachusetts, 864-3352.
2. Consulting Information Available.
    a. Bureau of Child Research—Ross Copeland, 223 Haworth Hall, 864-4295. Film lab, Bob Gardner.
    b. Audio-Visual Center Film Rental Service—Breck Marion, 746 Massachusetts Street, 864-3352.
    c. Department of Radio, T.V., Film—Bruce Linton (Chairman). Film—Peter Dart, 217 Flint Hall, 864-3991. Technician—Francis Ellis, 218 Flint Hall, 854-3991.
3. Production Possibilities for a Fee.
    a. Bureau of Child Research—Ross Copeland, 223 Haworth Hall, 864-4295.
    b. Radio, T.V., Film—Bruce Linton, Peter Dart, 864-3991.
4. Repair and Maintenance of Equipment. Wally May, Continuing Education, 864-4585.
5. Department and Bureaus with Large Holdings and High Use of Film Equipment.

        a. Bureau of Child Research—Ross Copeland, 223 Haworth Hall, 864-4295.
        b. Continuing Education, 864-4233.
        c. Radio, T.V., Film—Bruce Linton and Peter Dart, 217 Flint Hall, 864-3991.
        d. Athletic Department—Wayne Replogle, 3 Allen Field House, 864-3195.

C. **Still Photo**
    1. Equipment Available for Classroom Use (Projectors, Screens, Film-Strip Projectors) Audio Visual Department—Continuing Education—Ross Wulfkuhle, 2 Bailey Hall, 864-3306.
    2. Slide Libraries for Teaching (generally owned and maintained by the departments).
        a. Classics Department Slide Library—Professor in Charge, Elizabeth Banks, 211 Carruth-O'Leary, 864-3153.
        b. Art Museum and History of Art—Professor in Charge, Charles Eldredge, Spooner Basement, 864-4710.
        c. School of Architecture Library—Professor in Charge, Louis Michel, 304 Marvin Hall, 864-3697.
        d. Department of Chemistry and Department of Pharmacy, Slide and Sound Library—Malott Hall, Professor in Charge: Clark Bricker (Chemistry), 102 Malott, 864-4709; Gene Martin (Pharmacy), 315 Malott, 864-4001.
        e. Department of History, Charles Sidman, Chairman, 3006 Wescoe, 864-3569.
    3. Consulting Information on Production and Reproduction of Slides.
        a. Architecture Slide Library—Louis Michel, 304 Marvin Hall, 864-3697.
        b. Department of Radio, T.V., Film—217 Flint Hall, 864-3991.
        c. Department of Photo Journalism—School of Journalism, Flint Hall, 864-4755.
        d. Photo and Graphic Arts—Ed Julian, S-B Watson, 864-4767.
    4. Complete Services in Still Photography, Photo and Graphic Arts—Ed Julian, S-B Watson, 864-4767.
    5. Department and Bureaus with Large Holdings and High Use of Still Photo Equipment. There are some 57 Departments on campus with extensive still photo equipment, many having their own dark rooms.

D. **Television:** (Cameras, Receivers, V.T.R.'s, etc.)
    1. Equipment Available for Classroom Use.
        a. Audio Visual Department—Continuing Education—Ross Wulfkuhle, 2 Bailey Hall, 864-3306.

b. Office of Instructional Resources—Phil McKnight, 409 Bailey Hall, 864-4442.

2. Consulting Information Available on Equipment, T.V. Production, and use of T.V. for Teaching and Evaluation of Teaching.
    a. Audio Visual Department—Continuing Education—Ross Wulfkuhle, 2 Bailey Hall, 864-3306. (Equipment only)
    b. Department of Radio, T.V., Film, 218 Flint Hall, 864-4073. Rod Davis, Flint Hall, 864-3282. (Equipment and Productions)
    c. Chemistry—Clark Bricker, 102 Malott Hall, 864-4709. (Teaching)
    d. Education Curriculum Lab—Robert Ridgway, 213 Bailey Hall, 864-3464. (Teaching Evaluation)
    e. Office of Instructional Resources—Phil McKnight, 409 Bailey Hall, 864-4442. (Teaching and Teaching Evaluation)
    f. Speech Pathology—James Lingwall, 290 Haworth Hall, 864-4690. (Teaching and Teaching Evaluation)
    g. Space Technology—Robert Walters, 864-4775. (This Research Unit uses T.V. in a very specialized, highly technical fashion in connection with computers.)
3. Repair and Maintenance Advice for T.V. Equipment.
    a. Audio Visual Department—Continuing Education—Ross Wulfkuhle, 2 Bailey Hall, 864-3306.
    b. Bureau of Child Research—Technical Engineer, John Trewolla, 295 Haworth Hall, 864-4696.
    c. Department of Radio, T.V., Film—Technical Engineer, Rod Davis, Flint Hall, 864-3282 or 864-3991.
4. Department and Bureaus with Large Holdings and High Use of Television Equipment.
    a. Bureau of Child Research—Ross Copeland, 223 Haworth Hall, 864-4295.
    b. Audio Visual Department—Continuing Education—Ross Wulfkuhle, 2 Bailey Hall, 864-3306 (Service). Continuing Education, 864-3284 (Production).
    c. Chemistry—Clark Bricker, 102 Malott Hall, 864-4709.
    d. Department of Radio, T.V., Film—217 Flint Hall, 864-3350.
    e. Education, Special—Jerry Chaffin, 340 Haworth Hall, 864-4954.
    f. Human Development—Judith LeBlanc, 151 Haworth Hall, 864-3831.
    g. Pharmacy—Gene Martin, 315 Malott Hall, 864-4001.
    h. Social Psychology—Howard Rosenfield, 606 Fraser Hall, 864-4126.

    i. Social Welfare—Twente Hall, 864-4720.
    j. Space Technology Labs—Robert Walters, 864-4775.

E. **Other Audio Visual Equipment** (Overhead Projectors, Opaque, and Micro Readers).

  1. Equipment Available for Classroom Use.
  Audio Visual Department—Continuing Education—Ross Wulfkuhle, 2 Bailey Hall, 864-3306.

  2. Consulting and Repair of Other Audio Visual Equipment.
  Continuing Education, Wally May, 864-4585.
  Micro Readers, in general, must be repaired by the companies that built them.

  3. Departments and Bureaus that use other Audio Visual Machines are:
    a. Watson Library (Micro Film Readers), John Glinka, 133 Watson, 864-3601.
    b. Pharmacy/Chemistry (Slide and Sound Viewers), Clark Bricker, 864-4709, and Gene Martin, 864-4001.
    c. Education, Curriculum and Instruction (Miscellaneous Equipment), Lelon Capps, 118 Bailey Hall, 864-4800.

F. **Information available from the Audio Visual Center** (Breck Marion, 864-3352) on:

  1. Utilization of Audio Visual Materials
    a. Behavioral Objectives—A Programmed Approach
    b. Criteria for Selection of Nonbook Materials—a table telling what to look for when choosing audio visual materials.
    c. Definitions of audio visual terms, including the uses of educational television.
    d. Film Conversion Table—relating length of film (number of frames) to time period (number of minutes) and number of words.
    e. List of sources of materials and equipment—for producing, preparing and using audio visual instruction.

  2. Types of Materials Available and Operating Procedures.
    a. Chalkboards.
    b. Filmstrips and slides.
    c. Posters.
    d. How to adapt a room for audio visual instruction.
    e. Motion picture film and how to use a projector.
    f. The overhead projector.

  3. Preparation and Production of Materials.
    a. Lettering—how to make visual aids readable.
    b. Dry Mounting process.
    c. Rubber Cement Mounting process.
    d. The use of tearsheets.
    e. Producing transparencies
    f. Lifting pictures off tearsheets to produce a transparency.